

**SHARP****SERVICE MANUAL**

S26Q9VC-699E/

**VHS VIDEO CASSETTE RECORDER****MODEL VC-699E**

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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## SPECIFICATIONS

Format:	VHS standard
Video recording system:	Four rotary head helical scan system
Video signal:	PAL: PAL System-B/G (P.B/REC) PAL: PAL System-I (P.B/REC) PAL: PAL System-D (P.B/REC) SECAM: MESECAM System (P.B/REC) SECAM: SECAM System-B/G (P.B/REC) SECAM: SECAM System-D/K (P.B/REC) NTSC: NTSC4.43 (P.B/REC) NTSC: NTSC3.58 (P.B/REC)
Recording/playing time:	240 min max. with SHARP E-240 tape (PAL/MESECAM/SECAM in SP mode) 8 hours max. with SHARP E-240 tape (PAL/MESECAM/SECAM in LP mode) 160 min max. with SHARP T-160 tape (NTSC in SP mode) 8 hours max. with SHARP T-160 tape (NTSC in LP (EP) mode)
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec. (PAL in SP mode) 33.34 mm/sec. (NTSC in SP mode) 11.7mm/sec. (PAL in LP mode) 11.12mm/sec. (NTSC in LP (EP) mode)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF CCIR I1 ~ S20 UHF E21 ~ M83
RF converter output signal:	UHF channel E30 ~ E39 (adjustable). Preset to ch E36
Power requirement:	AC110 ~ 240V, AUTO 50/60Hz
Power consumption:	Approx. 31W (with anti-dew heater)
Operating temperature:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	7.5 kg
Dimensions:	430 mm (W) x 380 mm (D) x 114 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	0 dB = 0.775 Vrms
Input:	Line: -8 dB, more than 50 k ohm
Output:	Line: -5 dB, less than 1 k ohm
Accessories included:	Antenna 75 ohm coaxial connector cable (plug provided) Remote control unit OPERATION MANUAL
Note:	The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined VHF/UHF antenna with 75 ohm connector.

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

## REMOVAL OF MAIN PARTS

### ■ Printed Wiring Board Removal

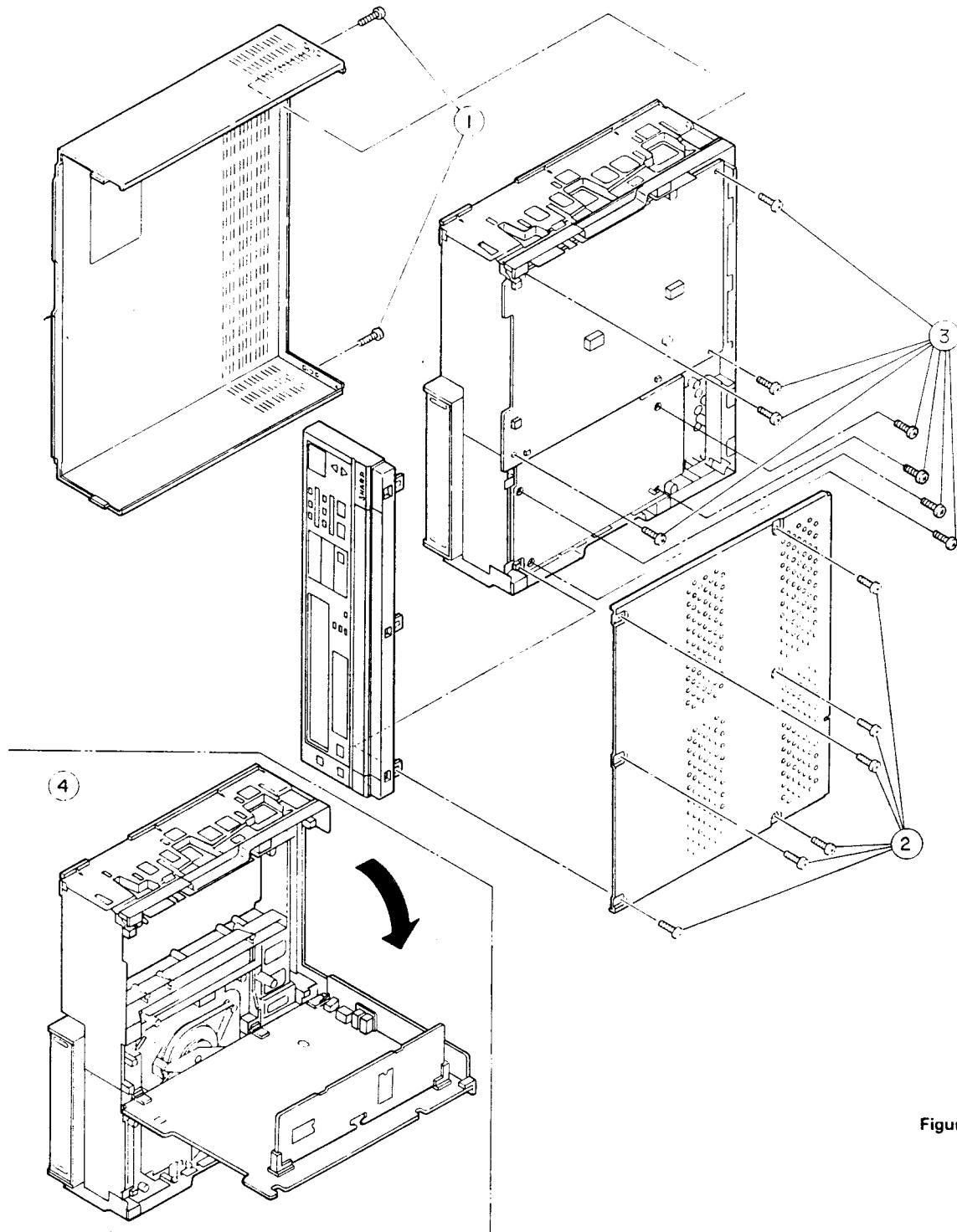
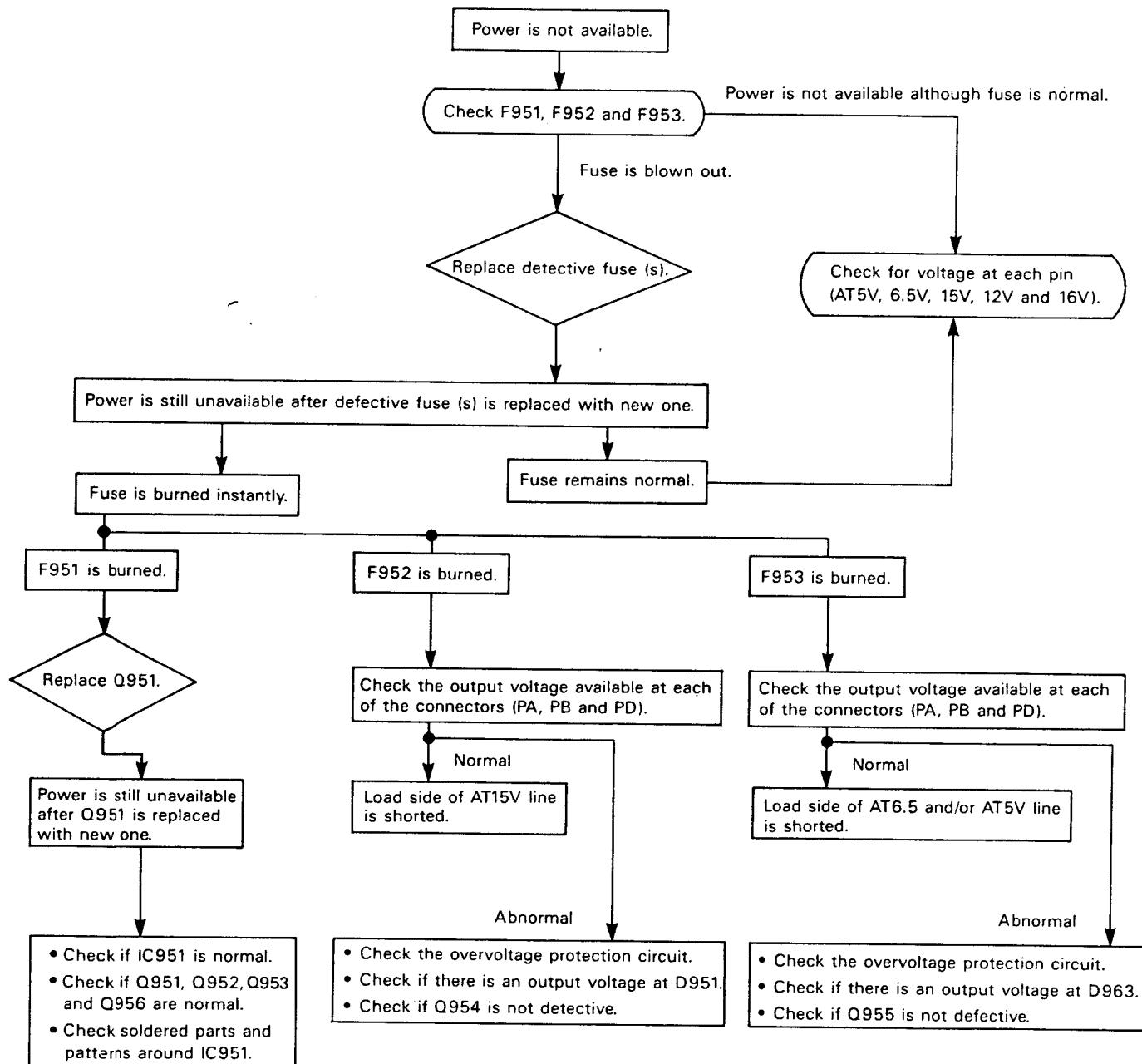


Figure 1.

- ① Remove the two screws from the side panel, and shift the top cabinet backwards to remove it.
- ② Remove the six screws from the bottom plate.
- ③ Remove the four screws from the main PWB. Remove the four screws from the tuner IF/audio PWB.
- ④ Open the main PWB towards the arrow ➔.

## TROUBLESHOOTING GUIDE

### ■ Power unit

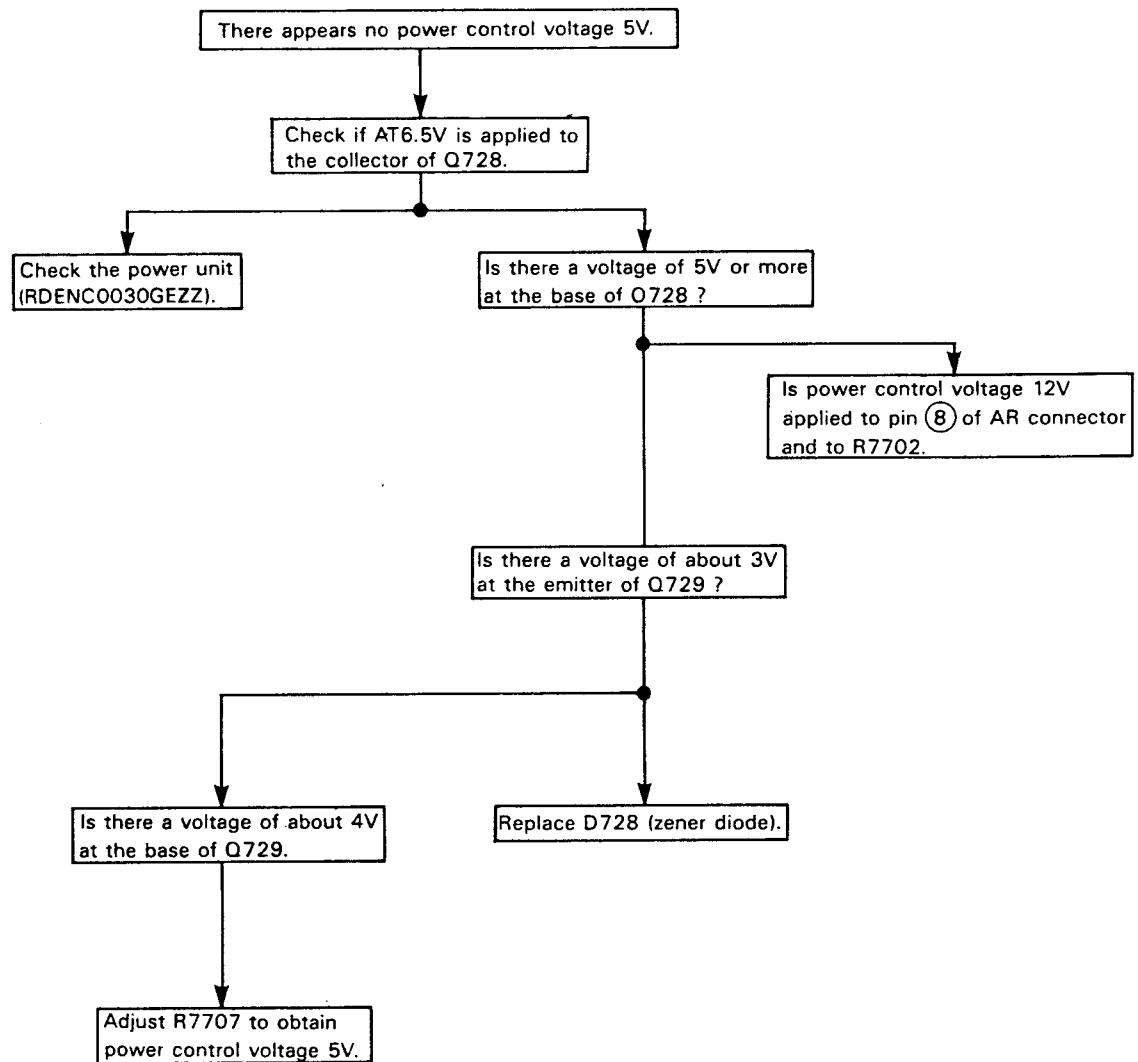


**Note:**

The overvoltage protection circuit is operated with the following voltages:

- In the case of 15V line → About 17.5V (high limit)
- In the case of 6.5V line → About 10.5V (high limit)

■ Power control voltage 5V



## ■ TROUBLES OF CONTROL SYSTEM (SYSTEM CONTROLLER CIRCUIT)

No.	Problems	Probable causes and countermeasures
1.	No power is supplied.	<ul style="list-style-type: none"> <li>The fuse is blown out; check if there occurs a short-circuit in the internal circuit.</li> <li>Check if there are produced AT5V, UR (un-regulated) 15V and AT12V in the power circuit; if not, this means that the power circuit is defective.</li> <li>Check if the system controller (IC801) is normally functioning; check if there are produced all clear signal at pin ⑨ of IC801 and clock signal at pin ⑩ of IC801.</li> <li>Check if the power control signal (High) goes out of pin ④ of IC801.</li> </ul>
2.	No operation is available.	<ul style="list-style-type: none"> <li>Check if the start sensor signal and end sensor signal are applied to pin ⑭ and pin ⑮ of IC801 respectively.</li> <li>Check if the unit is in timer mode.</li> <li>Check if the unit is in sensor stop mode.</li> <li>The cam switch is poorly adjusted for its positioning.</li> <li>Check if the key input voltage is as specified.</li> </ul>
3.	After tape loading, the unit is stopped with the tape kept wound over the drum, or the cassette can't be ejected.	<ul style="list-style-type: none"> <li>The cam switch is poorly adjusted for its positioning.</li> <li>IC802 is defective.</li> <li>Capstan motor control circuit is defective.</li> </ul>
4.	The unit will stop immediately after it is set in playback or record mode.	<ul style="list-style-type: none"> <li>Check if the head switching pulse is applied to pin ⑯ (for the drum sensor) of IC801.</li> <li>Check if the drum motor is rotating.</li> <li>Check if the drum pulse generator's signal is applied to pin ⑰ of the servo circuit (IC703).</li> </ul>
5.	The unit will stop a few seconds after it has been set in playback or record mode, or the tape running will stop on the way.	<ul style="list-style-type: none"> <li>Check if the reel pulse is applied to pin ⑯ (for the reel sensor) of IC801.</li> <li>Check if the reel disk is rotating.</li> <li>Check if the reel idler is not stained nor defective.</li> </ul>
6.	The tape is not running (the tape is not taken up.)	<ul style="list-style-type: none"> <li>The capstan motor and/or reel idler is defective.</li> <li>The reel brake is defective.</li> </ul>
7.	The unit stops sometimes during playback or recording.  The tape can't be taken up when tape unloading.  The tape is scratched when it is wound video search is impossible.	<ul style="list-style-type: none"> <li>Check if there is produced capstan mute signal at pin ⑯ of IC801.</li> <li>Check if there are reel sensor signal and drum sensor signal applied to pins ⑯ and ⑰ of IC801 respectively.</li> <li>Check if there is produced capstan motor rotation signal (reverse) at pin ⑯ of IC801 when tape unloading.</li> <li>Check if pins ⑯ and ⑰ of IC801 (servo mode signal) are at their proper level.</li> <li>Check if there are proper voltages at pins ⑯, ⑰, ⑱ and ⑲ of IC702 when the unit is in the video search mode.</li> </ul>

## ■ TROUBLES OF CONTROL SYSTEM (SERVO CIRCUIT)

No.	Problems	Probable causes and countermeasures
1.	<p>Capstan motor is not rotating.</p> <ul style="list-style-type: none"> <li>• When the unit is in playback or record mode, there is no reel pulse produced (to disable the reel take-up operation) so that the microcomputer in the system controller gets in stop mode when some length of time has elapsed.</li> </ul>	<ul style="list-style-type: none"> <li>• There is not clock signal (4.43MHz and/or 3.58MHz) at pin ⑯ of IC702 (main servo IC) or the output level of clock signal, if exists, is insufficient.</li> </ul> <p><b>Note:</b> When measuring the output of pin ⑯ of IC702, the probe of oscilloscope in use must be of low capacitance, or the measurement will be inaccurate.</p> <ol style="list-style-type: none"> <li>1. Check if PC5.1V and AT5V are as specified.</li> <li>2. Check if the chroma circuit and switching circuit are normally functioning. Also check if their signal output level is normal.</li> <li>3. Check for voltage of Q723.</li> <li>4. Check if L704 is normal.</li> </ol> <ul style="list-style-type: none"> <li>• Capstan motor drive voltage is higher or lower than specified (with AT15V being as specified).</li> </ul> <ol style="list-style-type: none"> <li>1. Check if vertical reference voltage is about 2.5V (at pin ① of AK connector). If so, check for operation of the capstan motor.</li> <li>2. Check if current limiter voltage is about 4V (at pin ② of AK connector). If so, check for operation of the capstan motor (to see if Q7015 is turned on).</li> <li>3. Check if capstan motor control voltage is about 3V (at pin ⑧ of AK connector). If so, check if vertical reference voltage is as specified (at pin ① of IC706); check if output voltages at pins ⑧, ⑩ and ⑪ of IC701 are all normal; check for voltages of Q725, Q7019 and Q732.</li> <li>• The voltage for capstan motor reverse rotation is not as specified (at pin ⑦ of AK connector). In this case, check for the system controller, Q7005 and Q7006.</li> </ol>
2.	Capstan motor rotates at higher speed than specified.	<ul style="list-style-type: none"> <li>• There appears no capstan frequency generator's signal.</li> </ul> <ol style="list-style-type: none"> <li>1. Check for the capstan motor.</li> <li>2. Check for the circuit around IC701.</li> </ol> <ul style="list-style-type: none"> <li>• There is produced no capstan PWM (pulse width modulation) pulse.</li> </ul> <ol style="list-style-type: none"> <li>1. Check for mode 1, mode 2 and VSC (video search control) 0 to 3 (at pins ⑩, ⑪, ⑯ to ⑰ of IC702).</li> <li>2. Check for IC705 and IC702.</li> </ol>
3.	Capstan motor rotates at lower speed than specified.	<ul style="list-style-type: none"> <li>• Playback speed detection circuit functions incorrectly (there is High level output at pin ⑥ or ⑦ of IC701).</li> </ul> <ol style="list-style-type: none"> <li>1. Check for output voltages at pins ② to ⑧ of IC703 (playback control amplifier).</li> </ol>

No.	Problems	Probable causes and countermeasures
4.	Noise appears at reproduced picture periodically.	<ul style="list-style-type: none"> <li>Capstan servo circuit is defective.           <ol style="list-style-type: none"> <li>Check for the loop in which playback control signal is flowing.</li> <li>Check for the loop between pin (4) of IC702 and pin (10) of IC703 in which vertical sync signal (tracking monomultivibrator) is flowing.</li> <li>Check for the loop in which capstan AFC/APC, PWM, LPF and DC amplifier are arranged.</li> </ol> </li> </ul>
5.	Horizontal bar (noise) appears at the lower part of reproduced picture.	<ul style="list-style-type: none"> <li>Playback phase is misadjusted.           <ol style="list-style-type: none"> <li>Check for R753, R755, R791 and R793.</li> </ol> </li> </ul>
6.	Picture flows horizontally.	<ul style="list-style-type: none"> <li>This phenomenon does not occur in the compulsive mode.           <ol style="list-style-type: none"> <li>Check and readjust the sync separator and 50Hz/60Hz discriminator circuit.</li> <li>Check the 50Hz/60Hz selection line. (High level at 60Hz line, etc.)</li> </ol> </li> <li>Picture flows horizontally at any mode.           <ol style="list-style-type: none"> <li>Check the drum servo block (drum FG amplifier, clock frequency, output voltage, drum motor control amplifier and drum motor).</li> </ol> </li> </ul>
7.	Slow operation and frame advance are not available.	<ul style="list-style-type: none"> <li>Check if there is frame advance pulse at pin (8) of IC7001.</li> <li>Check if still/slow pulse (High level) is applied to pin (9) of IC7001.</li> <li>Check if the start phase monomultivibrator (at pin (3) of IC7001) and drive pulse monomultivibrator (at pin (1) of IC7001) are normally functioning.</li> <li>Check if capstan motor control voltage and capstan current limiter voltage are 3 to 4V respectively, when Q7012 and Q7020 are turned on.</li> <li>Check if the slow/still trapezoidal monomultivibrator (at pin (15) of IC7001) is normally operating when control signal is applied to pin (16) of IC7001.</li> <li>Check if the brake monomultivibrator (at pin (14) of IC7001) is normally operating.</li> </ul>

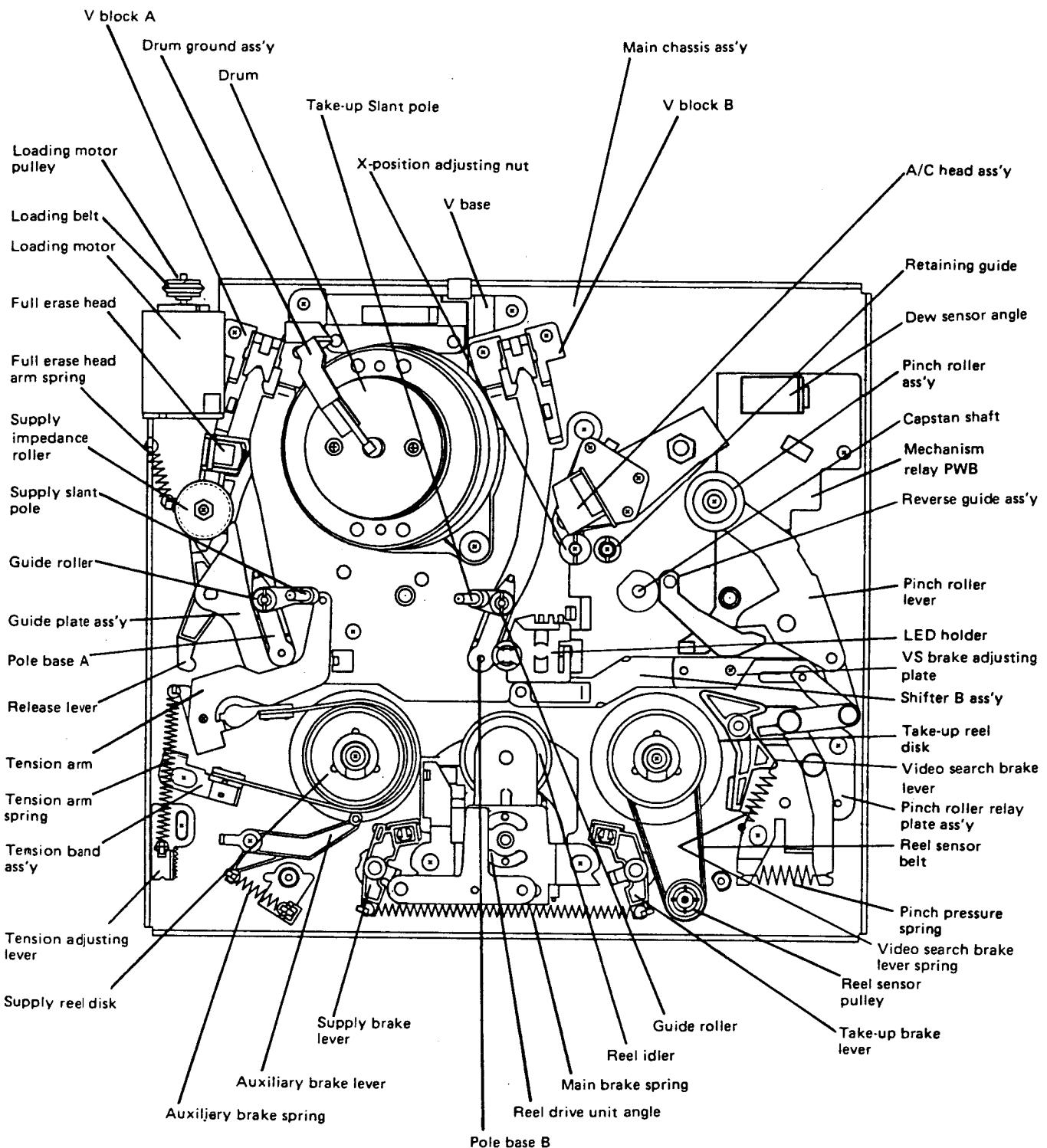
#### ■ TROUBLES OF SOUND AND REPRODUCED PICTURE (Y/C AND AUDIO CIRCUIT)

No.	Problems		Probable causes and countermeasures
1.	No picture appears.	At E-E mode	<ul style="list-style-type: none"> <li>Check if the video signal (E-E signal) is applied to pin (4) of IC201, and if it goes out of pin (10).</li> <li>Check if there is a normal voltage at each pin of IC201.</li> </ul>
		At playback of standard tape	<ul style="list-style-type: none"> <li>Make sure that there appears a normal picture at E-E mode.</li> <li>Check if playback FM signal is applied to pin (26) of IC401.</li> <li>Check if playback FM signal is reproduced at pin (3) of IC301.</li> </ul>
		At playback of the tape record by oneself.	<p>Before this checking, make sure that normal playback is possible with standard tape.</p> <ul style="list-style-type: none"> <li>Check if there is playback FM signal at pin (16) of IC401.</li> <li>Check if there is video signal at pin (1) of IC401 and pin (10) of IC201.</li> </ul>

No.	Problems	Probable causes and countermeasures
2.	No colour appears.	<ul style="list-style-type: none"> <li>Check if there is chroma signal at pin ② of IC501.</li> <li>Check if APC and/or AFC is not misadjusted. If it is not allowed to readjust them, this means that IC501 is defective.</li> <li>Check if there is a normal voltage at each pin of IC501.</li> </ul>
3.	The picture collapses when the tape recorded by oneself is played back. 	<ul style="list-style-type: none"> <li>Check if there is a normal voltage at each pin of head amplifier.</li> <li>Check if record current is not misadjusted.</li> <li>Check if deviation level, FM frequency and white/dark clip level are not misadjusted.</li> </ul>
4.		<ul style="list-style-type: none"> <li>Check if video head is not choked.</li> <li>Check if head amplifier is set at proper position.</li> <li>Check if head switching pulse is normal.</li> </ul>
5.	Noise is noticeable at E-E mode or when the tape recorded by oneself is played back.	<ul style="list-style-type: none"> <li>Tuner and/or RF converter is defective.</li> <li>Check if R531 (RF AGC control) is not misadjusted.</li> </ul>
6.	Noise is noticeable when the standard tape is played back.	<ul style="list-style-type: none"> <li>Clean the video head or replace it with a new one.</li> </ul>
7.	There appears no E-E sound.	<ul style="list-style-type: none"> <li>Check if there appears audio signal at pin ② of IC1502.</li> <li>Check if audio signal is applied to pin ① of IC602 and goes out of pin ⑨ .</li> <li>ALC is defective (D603, C626).</li> <li>Check if the audio muting circuit is normally operating.</li> </ul>
8.	There appears much of audio noise at E-E mode.	<ul style="list-style-type: none"> <li>Check if SW1501 is set at proper position.</li> <li>Check if RF converter and audio switching circuit are normally operating.</li> <li>Check if the peripheral circuit of IC1503 is normally operating.</li> <li>Check if CF1502 and CF1503 are normally operating.</li> </ul>
9.	There appears no sound at playback mode.	<ul style="list-style-type: none"> <li>The audio head is defective.</li> <li>Check if playback signal is applied to pin ⑯ of IC602 and goes out of pin ⑨ .</li> </ul>
10.	Sound is distorted.	<ul style="list-style-type: none"> <li>The audio head is magnetized or defective.</li> <li>Bias current is insufficient.</li> </ul>
11.	Record/Playback sensitivity is low.	<ul style="list-style-type: none"> <li>The audio head is magnetized or defective.</li> <li>The bias circuit is not operating.</li> </ul>
12.	Recording is not possible.	<ul style="list-style-type: none"> <li>The bias circuit is not operating.</li> </ul>
13.	There appears much of hum and noise.	<ul style="list-style-type: none"> <li>The audio head is defective.</li> </ul>
14.	No colour appears at E-E mode or there is beating in the reproduced picture (in the case of NTSC 3.58 system).	<ul style="list-style-type: none"> <li>M12V circuit is defective (pin ⑤ of II connector).</li> <li>Q1501, Q1504 and IC1504 are defective.</li> <li>Check if TV tuning control is not detuned.</li> <li>Check if video's tuning control is not detuned.</li> </ul>

## **MECHANICAL DRIVE SECTION NAMES OF PARTS**

- TOP VIEW



**Figure 2.**

## MECHANICAL DRIVE SECTION NAMES OF PARTS

## • TOP VIEW

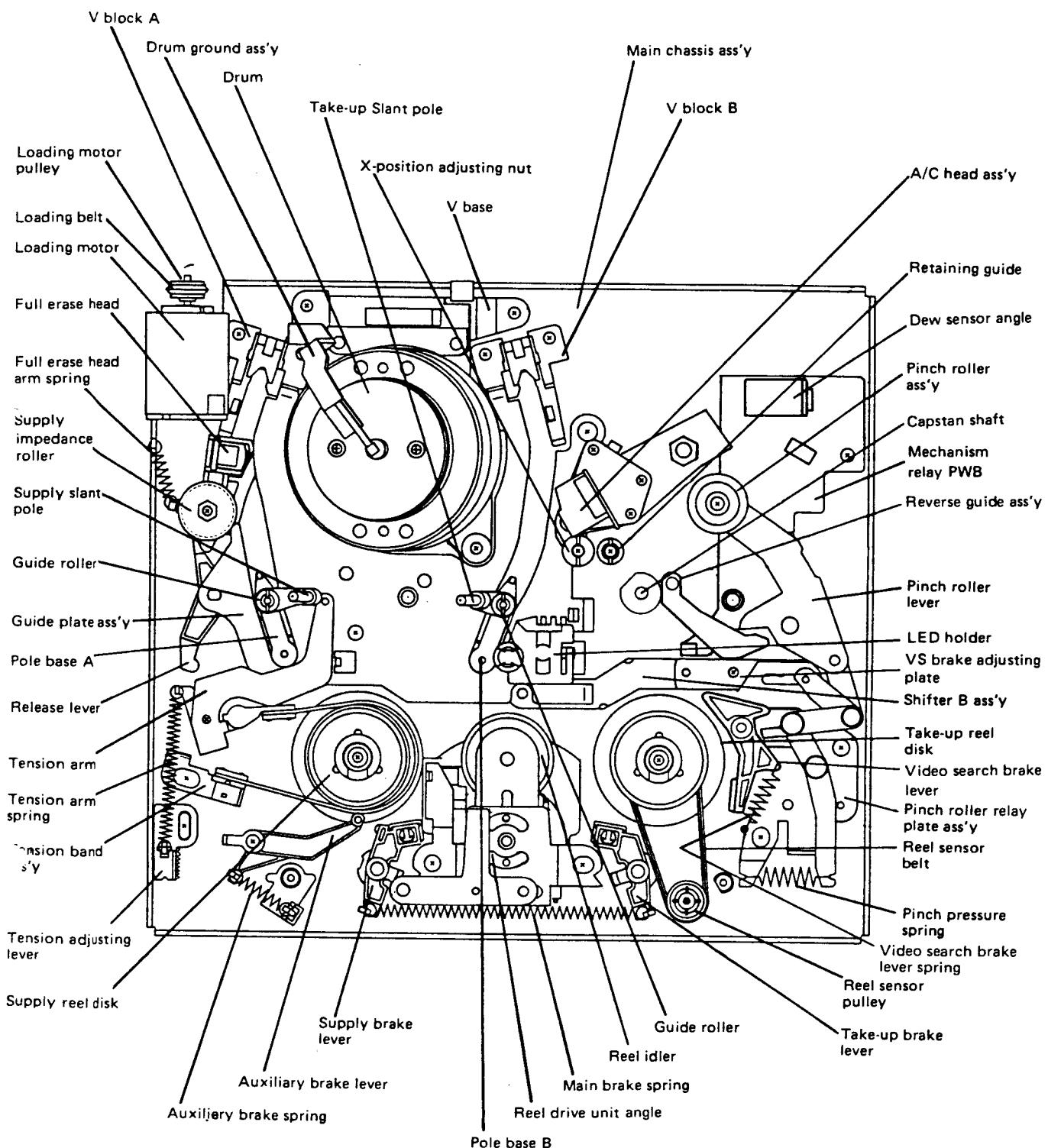


Figure 2.

• BOTTOM VIEW

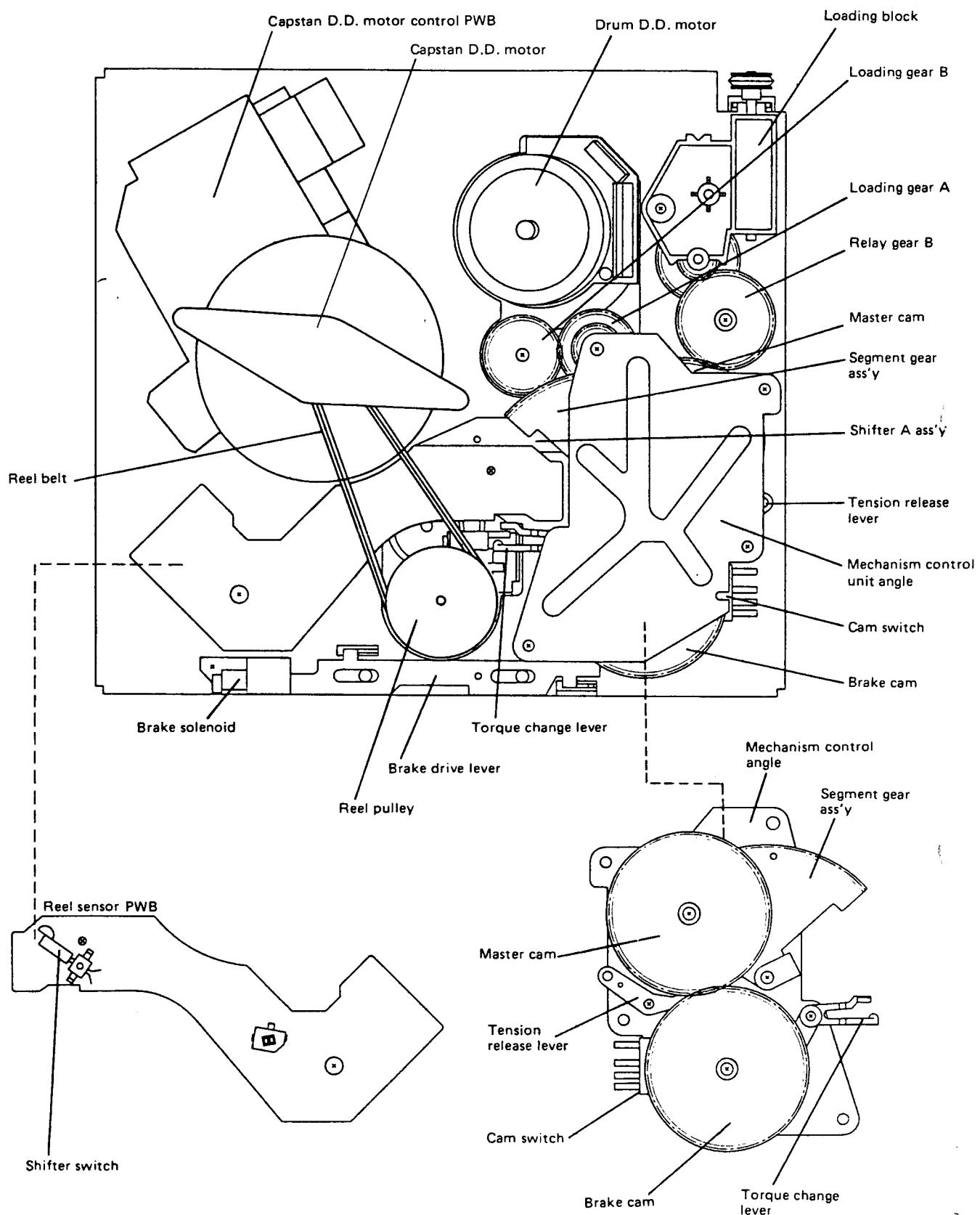


Figure 3.

## HEAD CLEANING

### ■ CLEANING OF VIDEO HEAD

Cleaning of the video head is possible in two different ways i.e., by using either a cleaning tape or a chamois skin. It is, however, preferable for you to do

the head cleaning by means of a chamois skin because frequent use of a cleaning tape will result in wears of the video head surface.

#### 1. Head cleaning by using a cleaning tape

Procedure	Remark
<ol style="list-style-type: none"> <li>1. Put a cleaning tape into the compartment.</li> <li>2. Let the cleaning tape run in playback mode.</li> <li>3. Stop the cleaning tape within 10 seconds.</li> <li>4. Take the cleaning tape out of the compartment. Then make recording on a video tape and play it back to see if the playback is normally performed.</li> <li>5. If the above cleaning is not satisfactory, repeat it one more time or twice.</li> </ol>	<ol style="list-style-type: none"> <li>1. Do not allow the cleaning tape to run for more than 10 seconds for each cleaning.</li> <li>2. If the cleaning is repeated three times and this is not satisfactory, be sure to stop the cleaning immediately, and instead perform the cleaning by using a chamois skin shown next.</li> </ol>

#### 2. Head cleaning by using a chamois skin

Prior to starting this type of cleaning, open the upper case according to the instructions given on Page 3. The following shows in which positions the upper drum (video head) and other tape running parts are located respectively.

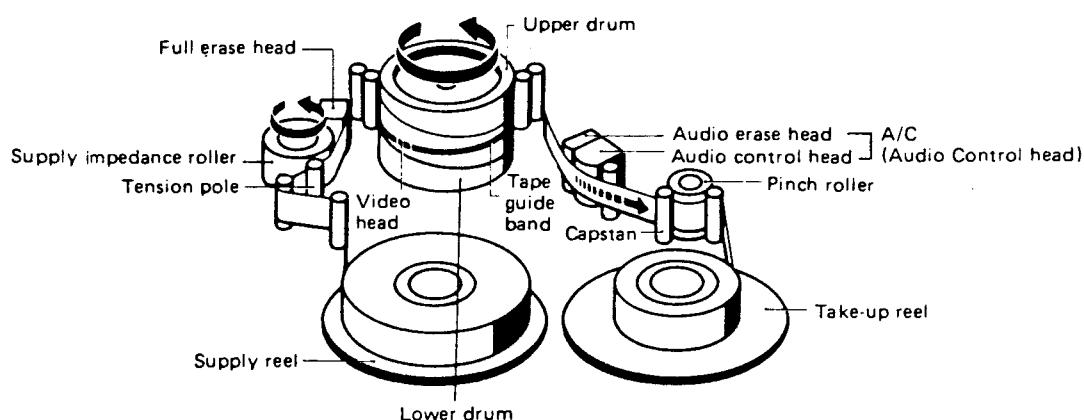


Figure 4.

#### Note:

During the cleaning, be careful not to damage the upper drum and other tape running parts.

## ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

Here we will describe a relatively simpler service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or replacement, for

example). We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original efficient condition.

### ■ TOOLS NECESSARY FOR ADJUSTING MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

	Jig Item.	Part No.	Configuration	Remarks
1	Master plane and reel disk height adjusting jig.	JiGRH0002		These jigs are used for checking and adjusting of relative mechanical heights between reel disk and stay.
		JiGMP0001		
2	A/C head tilt, supply impedance roller height adjusting jig	JiGACH51B	(a)  (b)	This jig is used for height adjustment of the running tape.
	Fixed guide height adjusting jig	JiGGH51B		This is used for take-up retaining guide height adjusting.
3	Torque gauge (90g.cm)	JiGTG0090		These jigs are used for checking and adjusting the torque of take up and supply reels.
	Torque gauge (1.2kg.cm)	JiGTG1200		
4	Gauge head	JiGTH0006		
5	Torque cassette meter	JiGVHT-063		Torque cassette meter can be used to measure take-up reel torque in the playback and recording mode as well as back tension.
6	Tension gauge (300g)	JiSGS0300		There are several gauges used for the tension measurements.
	Tension gauge (2.0kg)	JiSGS2000		
7	Tension gauge adaptor	JiGADP003		This jig is used for the tension gauge.
8	Hexagon wrench (0.9 mm)	JiGHW0009		These jigs are used for loosening or tightening special hexagon type screws.
	Hexagon wrench (1.2 mm)	JiGHW0012		
	Hexagon wrench (1.5 mm)	JiGHW0015		
9	Drum replacement jig	JiGDT-0001 or JiGDT-0001CD		This jig is used for the replacement of video cassette recorder's upper drum.
10	Box driver	JiGDRIVER110-7		This jig is used for height adjustment of the audio/control head.
		JiGDRIVER11055		This jig is used for adjustment of the supply impedance roller and reverse guide.

	Jig Item.	Part No.	Configuration	Remarks
11	Alignment tape cassette	VRōCPSV		These tapes are especially used for electrical fine adjustment.
	Alignment tape cassette	VRōATSV		
12	Special bladed screwdriver	JiGDRiVERH-4		This screwdriver is used for adjusting the guide roller height.
13	Torque driver	JiGTD1200		When screwing is needed at the resin-made part, be sure to use this torque driver: the specified torque is 5 kg.
14	Tension band and plate adjustment jig	JiGDRiVER-6		This jig is used for adjustment tension band and tension plate adjust.

**NOTE:**

Current JiGMA0001 contains master plane (JiGMP0001) and disk height adjusting jig (JiGRH0001). Even though new disk height adjusting jig (JiGRH0002) covers wider height, this new jig (JiGRH0002) can be used for current JiGRH0001, current jig (JiGRH0001) cannot be used as JiGRH0002. Master plane (JiGMP0001) can be used with JiGRH0001, and also JiGRH0002.

Failure to use the listed tools will make repair work lengthy and a matter of trial and error, with the likelihood of ultimately unsatisfactory results.

These tools will be required frequently, so be sure to follow the instructions in this manual throughout the repair, adjustment and checking process.

## ■ PREVENTIVE CHECKS AND SERVICE INTERVALS

The following intervals for checks and servicing should be observed in order to maintain the hight quality of mechanical components.

Maintained every Parts	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Remarks
Guide roller ass'y	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Abnormal rotation or significant vibration requires replacement.  Clean with industrial-grade methyl alcohol.
Supply impedance roller	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Supply Impedance roller (inner)		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
Supply Impedance roller flange B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Retaining guide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Guide flange B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Slant pole	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Video head	<input type="checkbox"/>	<input type="checkbox"/> ○	<input type="checkbox"/>	<input type="checkbox"/> ○	<input type="checkbox"/> ○	
Full erase head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Audio/Control head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Reel sensor belt				<input type="circle"/>		Clean rubber and rubber contact area with the specified cleaning liquid.
Pinch roller	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ○	
Reel belt		<input type="checkbox"/>		<input type="circle"/>		
Loading belt		<input type="checkbox"/>		<input type="circle"/>		
Capstan D.D. motor				<input type="circle"/>		
Loading motor				<input type="circle"/>		Clean with industrial-grade methyl alcohol.
Supply/Take-up reel disks		<input type="checkbox"/> △		<input type="checkbox"/> △		
Tension band ass'y					<input type="circle"/>	
Reel drive unit					<input type="circle"/>	
Reel idler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pulley (B)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Video search brake lever				<input type="circle"/>		

○ ... Replace    □ ... Clean    △ ... Oil

## REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

### Notes:

1. During removal and reassembly of the cassette housing, take care not to hit the nearby guide pins and the drum.
2. Do not forget to remove the AC power supply plug from the wall outlet at removal and reassembly.

### Removal

1. Press the cassette eject button, and remove the cassette from the housing.
2. Pull off the connector on the right side of the cassette housing.

#### Note:

- Be careful not to break the leads of the connector.
3. Remove two screws fixing the cassette housing.
  4. Shift the cassette housing toward the arrow **B** direction shown in Fig. 8 and take it out upwards.

### Reassembly

1. Connect the connector on the right side of the cassette housing.
2. Insert the hooks of the cassette housing into main chassis, shift it toward the arrow **A**, and fix it temporarily. Check if the cassette housing is placed in the right position and fix it with two screws (XHPS330P06WS0).
3. Arrange the leads of the connector properly on the right side of the cassette housing.

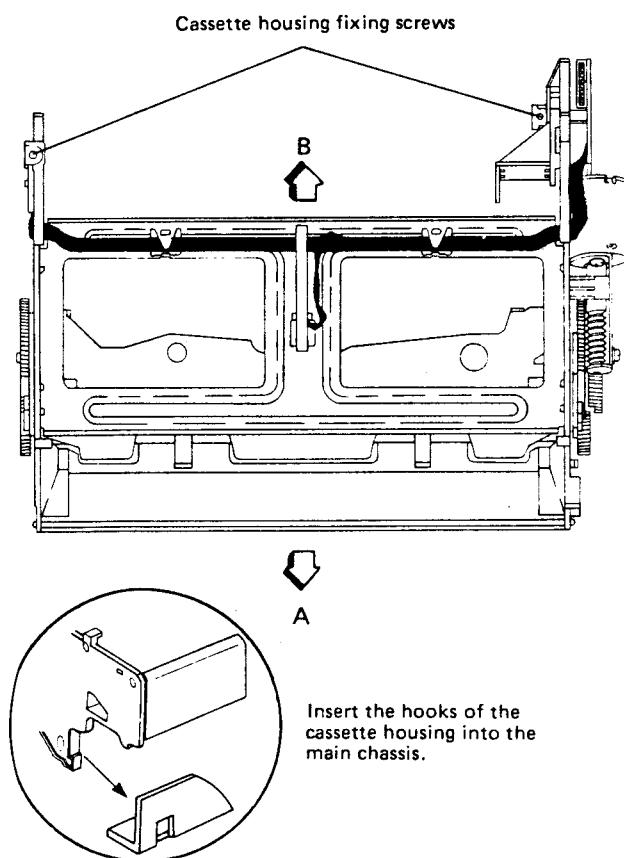


Figure 8.

## WHEN RUNNING A TAPE WITHOUT CASSETTE HOUSING

1. Open the cover of a cassette tape by hand and hold it open with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism. Then stabilize the cassette tape with a weight (500g or less).

#### Note:

The weight should not be more than 500g.

## REPLACEMENT AND HEIGHT ADJUSTMENT OF REEL DISKS

### Removal of supply reel disk

1. Remove the tension band **⑦**, and tension arm **⑧**.
2. Remove the slit washer **①**.
3. Remove the clearance adjusting washer **②**.
4. Lift the supply reel disk **③** upwards to remove, and replace.

### Removal of take-up reel disk

1. Remove the reel sensor belt **⑥**.
2. Remove the slit washer **①**.
3. Remove the clearance adjusting washer **②**.
4. Lift the take-up reel disk **④** upwards to remove, and replace.

### Notes:

1. After replacing either of the reel disks, be sure to perform its height adjustment.
  2. Take care not to damage to the tension band **⑦**.
  3. Be careful not to deform the auxiliary brake lever, supply brake lever and take-up brake lever.
  4. Check the tension pole position (see Fig. 15).
- \* At the time, remove the height adjusting washer **⑤**.

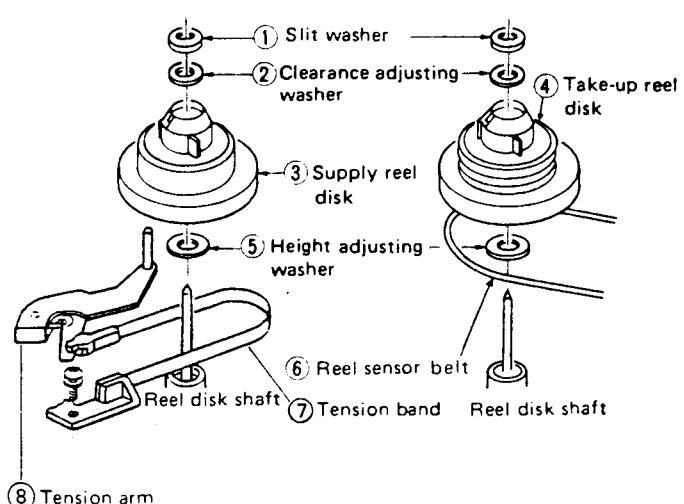


Figure 9.

**Reassembly of supply reel disk.**

1. Clean the reel disk shaft and fit the height adjusting washer ⑤ .
2. Place the new supply reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new supply reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.
5. Fit the clearance adjusting washer ② .

**Note:**

The reel disk thrust play should be 0.1 to 0.5mm.

6. Fit the slit washer ① .
7. Fit the tension band ⑦ , and tension arm ⑧ .

**Reassembly of take-up reel disk**

1. Clean the reel disk shaft and fit the height adjusting washer ⑤ .
2. Place the new take-up reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new take-up reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.
5. Fit the clearance adjusting washer ② .

**Note:**

The reel disk thrust play should be 0.1 to 0.5mm.

6. Fit the slit washer ① .
7. Fit the reel sensor belt ⑥ .

**Notes:**

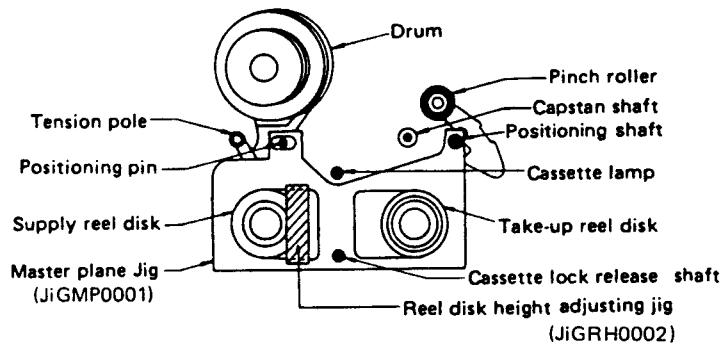
1. Take care not to scratch the reel disk or shaft with a slit washer or a tool at removal and reassembly.
2. After reassembly of the take-up reel disk, check the back tension in the video search mode and also the brake torque. (See the instructions on pages 19 and 22).

**HEIGHT CHECKING AND ADJUSTMENT**

1. Remove the cassette housing and set the master plane in the mechanism as shown in Fig. 10 (a), taking care not to hit the drum.
  2. Insure that the reel disk is lower than the part "A" but higher than part "B" of Fig. 10 (b), by using the reel disk height adjusting jig.
- If the height is not correct use the height adjusting washers looseness in backlash on the shaft should not exceed 0.1 to 0.5 mm.

**Note:**

Whenever replacing the reel disk, perform the height adjustment.



(a) top view

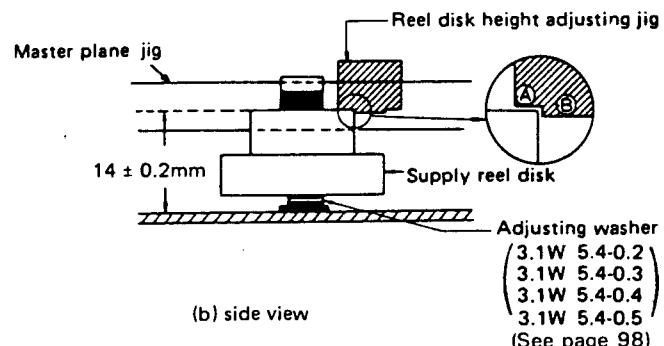


Figure 10.

**CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST-FORWARD MODE****Notes:**

1. When setting the torque gauge on the reel disk and pressing the fast-forward button to start the reel disk turning, take care that the torque gauge does not fly off.
2. The checking and adjustment should be carried out without a video cassette tape in place.

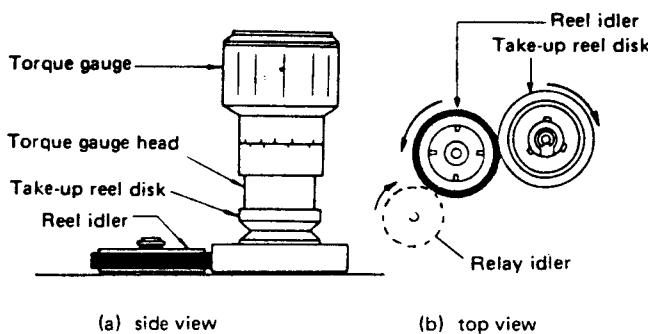
**Checking**

1. Remove the cassette housing.
  2. Set the torque gauge on the take-up reel disk and press the fast-forward button to get the unit in the fast-forward mode.
  3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more.
- Check that there is no slippage between the reel idler, and relay idler or take-up reel disk.

**Adjustment**

If the take-up torque is outside the specified value, clean the relay idler, reel idler and take-up reel disk with cleaning fluid, and recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.



**Figure 11.**

## **CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE**

### **Notes:**

1. When setting the torque gauge on the reel disk and pressing the rewind-button to start the reel disk turning, take care that the torque gauge does not fly off.
  2. When checking the take-up torque, do not keep the reel disk in a lock condition for a longer time.

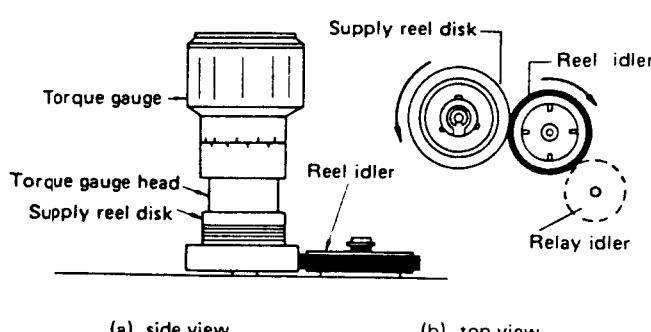
## Checking

1. Remove the cassette housing.
  2. Set the torque gauge on the supply reel disk and press the rewind button to get the unit in the re-wind mode.
  3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more. Check that there is no slippage between the reel idler and relay idler or supply reel disk.

### **Adjustment**

If the take-up torque is outside the specified value, clean the relay idler, reel idler and supply reel disk with cleaning fluid, then recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.



**Figure 12**

## **CHECKING OF TAKE-UP TORQUE IN PLAY BACK MODE**

## Checking

Load a torque cassette meter (JiGVHT-063) into the unit and press the record button to get the unit in the record mode. (It is necessary to input the external signal). Then check that the torque is at the specified values: standard torque:

LP 95 ± 15g.cm

Note:-

The measured torque varies slightly with the rotation deviation of the reel drive unit. The control value within the variation shall be the observed value.

### **Adjustment**

1. If the take-up torque in playback mode is outside the specified value, clean the reel idler, take-up reel disk and relay idler with cleaning fluid, then recheck the torque.
  2. Press the record button to get the unit in the record mode, and check that the take-up torque is within the specified value.
  3. Even after step 1 above, if the take-up torque in playback mode is still out of specification, replace the reel drive unit.

## **CHECKING OF BACK TENSION IN FAST-FORWARD MODE**

**Note:**

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

## Checking

1. Remove the cassette housing.
  2. Press the fast-forward button to get the unit in the fast-forward mode.
  3. Set the torque gauge on the supply reel disk, turn it clockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within 15 to 35 g.cm.

## **CHECKING OF BACK TENSION IN REWIND MODE**

**Note:**

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

## Checking

1. Remove the cassette housing.
  2. Press the rewind button to get the unit in the re-wind mode.
  3. Set the torque gauge on the take-up reel disk, turn it counterclockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within 4 to 15g.cm.

## CHECKING OF BACK-TENSION IN VIDEO SEARCH FAST-FORWARD MODE

### Notes:

1. Check and adjust the back-tension in video search fast-forward mode after adjusting the position of the tension arm.
2. Set the torque gauge securely on the reel disk, otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

### Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Press the video search fast-forward button to get the unit in the video search fast-forward mode and check that the auxiliary brake is acting on the supply reel disk.
4. Set the torque gauge on the supply reel disk, slowly turn it clockwise (one rotation every 2 to 3 seconds) and check the torque.

## CHECKING OF BACK TENSION IN VIDEO SEARCH REWIND MODE

### Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

### Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Press the video search rewind button to get the unit in the video search rewind mode.
4. Set the torque gauge on the take-up reel disk, slowly turn it counterclockwise (one rotation every 2 to 3 seconds) and check that the torque is within 25 to 35g.cm.

## CHECKING OF PINCH ROLLER ENGAGEMENT FORCE

### Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Using a tension gauge adaptor, pull the pinch roller in the direction of arrow  $\rightarrow$  (A) (opposite to the pinch roller engagement) to that the pinch roller moves away from the capstan shaft.

4. Gradually return the pinch roller in the direction of arrow  $\rightarrow$  (B) to allow it to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the tension gauge (JiGSG2000).

For the measurement, pull the tension gauge which is to be fixed on the capstan shaft by means of the tension gauge adaptor.

5. Check that the reading on the gauge is in the specified range of 1000 to 1200g.

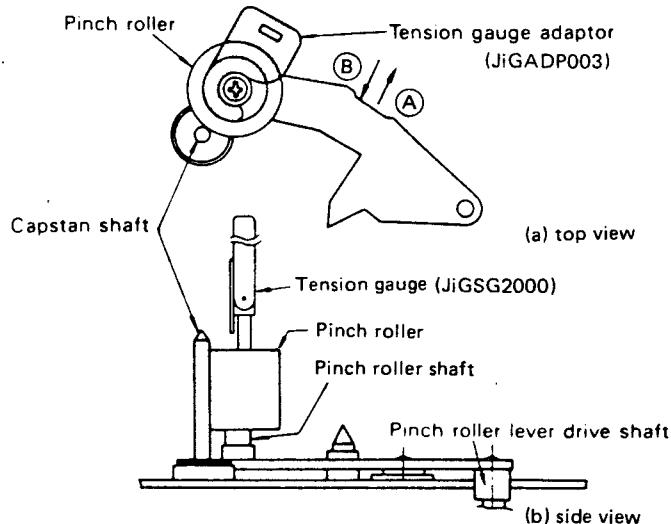


Figure 13.

## CHECKING OF REEL IDLER PRESSURE

### Checking

1. Remove the cassette housing.
2. Move the reel idler to its center position as shown in Fig. 14.
3. Using a tension gauge, push the reel idler in the direction of arrow  $\rightarrow$  (A) in Fig. 14, so that the reel idler moves away from the relay idler.
4. Release the force gradually in the direction of arrow  $\rightarrow$  (B) in Fig. 14, so that the reel idler touches the reel motor pulley again. Check that the reading on the tension gauge is within the specified range of 105 to 145g.

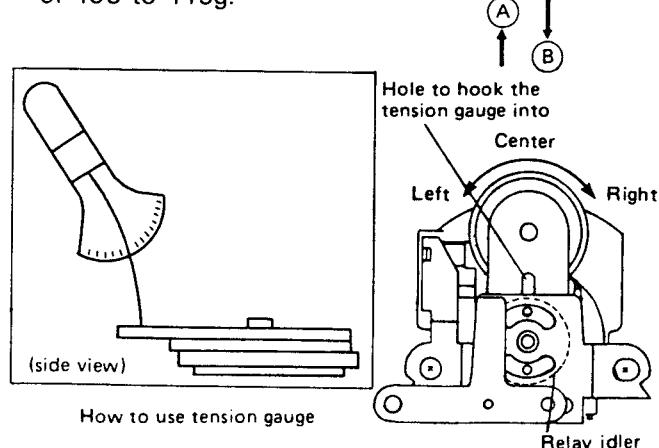


Figure 14.

## CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

### Checking

1. Remove the cassette housing.
2. Load a video cassette tape and press the record button to get the unit in the record mode.
3. The pole bases A and B (see page 10) operate to draw the tape out of the cassette housing and simultaneously the tension pole moves to the left, loading the tape. Check the position of the tension pole after the tape loading has finished.
4. At the end of a tape (T-120), visually check that the tension pole's center is 0.6 to 1.0mm to the right of the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search rewind mode, check that the reel disk is free of the tension band.

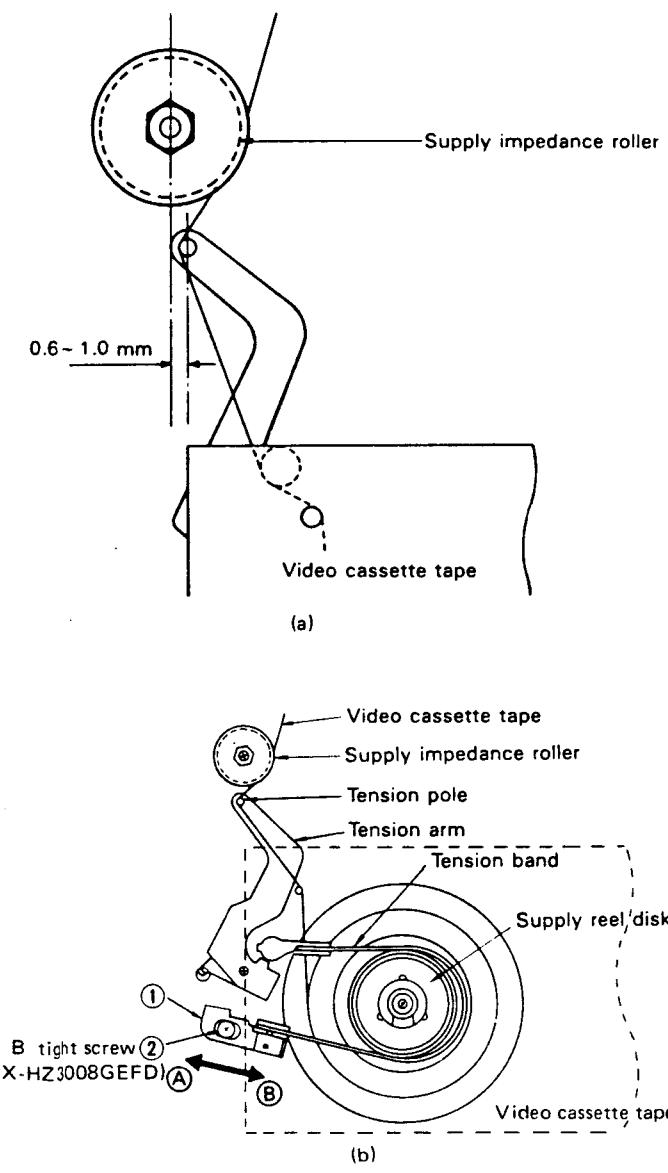


Figure 15.

### Positioning adjustment

1. If the tension pole is less than 0.6mm to the right of the supply impedance roller's center, shift the tension band control angle ① in the direction of arrow → (A) in Fig. 15(b), and tighten the screw ②.
2. If the tension pole is more than 1.0mm to the right to the supply impedance roller's center, shift the tension band angle ① in the direction of arrow → (B) in Fig. 15(b), and tighten the screw ②.

### Note:

If the screw is tightened with more than the specified torque (5 kg), the screw hole will be crushed as it is made of resin.

To avoid this, be sure to use the supplied torque driver (JiGTD1200).

## CHECKING AND ADJUSTMENT OF BACK TENSION IN RECORD AND PLAYBACK MODES

### Checking of back tension using a torque cassette meter (JiGVHT-063)

1. Remove the cassette housing.
2. Load the torque cassette into the unit.
3. Press the record button to get the unit in the record mode.
- Check that the reading of the torque cassette's pointer is within 50 to 58g.cm.
4. Check that the video tape is wound round the retaining guide.
5. Check that the tape is not slack or damaged at either of its begining and end points.

### Adjustment

1. If the reading is below 50g.cm, shift the tension adjusting lever ① in the direction of arrow → (A) in Fig. 16, and tighten the screw ②.
2. If the reading is over 58g.cm, shift the tension adjusting lever ① in the direction of arrow → (B) in Fig. 16, and tighten the screw ②.

### Note:

Do not overtighten the screws as this may damage the screw threads on the chassis. To avoid this, properly handle the tension band and plate adjusting driver (JiGDRIVER-6).

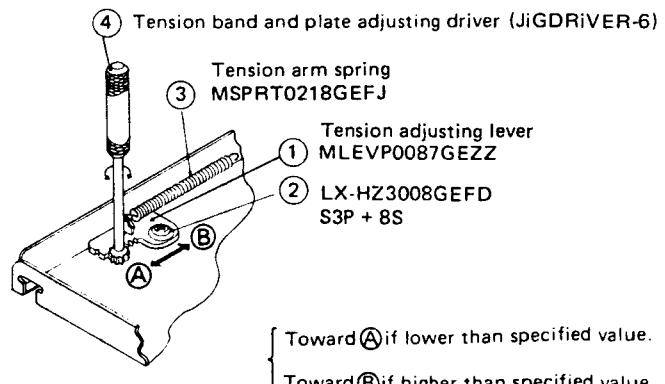


Figure 16.

## CHECKING OF THE BRAKE TORQUE

### Checking of the brake torque at supply side (Fig. 17)

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the supply reel disk, and set the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

### Adjustment of the brake torque at supply side (Fig. 17)

1. If the brake torque at supply side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the supply reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the brake torque at supply side is still not within the specified value, replace the main brake spring.

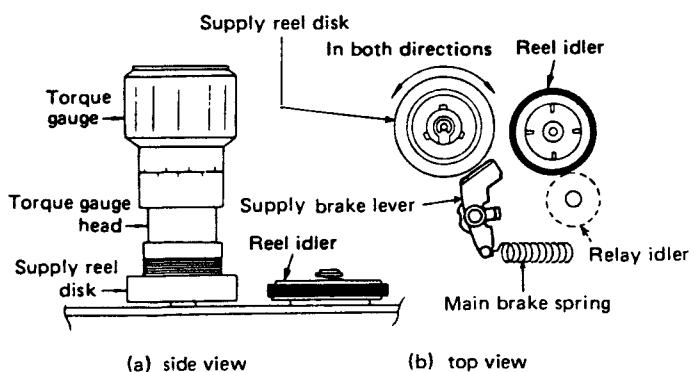


Figure 17.

### Checking of the brake torque at take-up side (Fig. 18)

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the take-up reel disk, and set the torque gauge on the take-up reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

### Adjustment of the brake torque at take-up side

#### (Fig. 18)

1. If the brake torque at take-up side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the take-up reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the torque at take-up side is still not within the specified value, replacement the main brake spring.

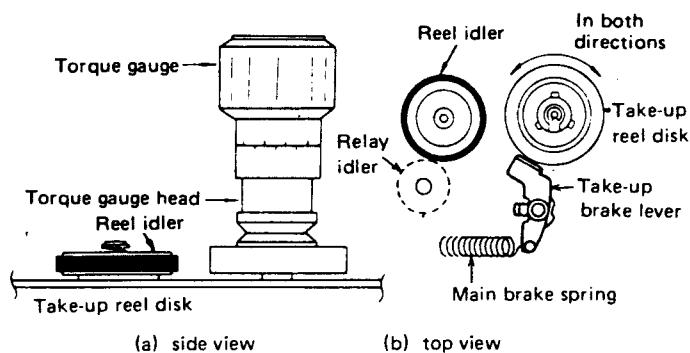


Figure 18.

## HEIGHT AND TILT CHECKING AND ADJUSTMENT OF SUPPLY IMPEDANCE RETAINING GUIDE AND AUDIO/CONTROL HEAD

### Adjustments

1. Put the unit in the loading mode.  
Set the supply impedance roller height adjusting jig (the same as the audio/control head tilt adjusting jig) on the main chassis as shown in Fig. 19. For details, also see Fig. 21. Using a box driver, slowly turn the supply impedance height adjusting nut until the roller's height is as specified.
2. Put the unit in the unloading mode.  
Set the retaining guide height adjusting jig on the main chassis as shown in Fig. 19. For details, also see Fig. 21. Using the adjusting screwdriver (JiGDRIVERH-4), slowly turn the retaining guide height adjusting nut until the guide's height is as specified.
3. Put the unit in the unloading mode.  
Set the audio/control head tilt adjusting jig on the main chassis as shown in Fig. 19. For details, also see Fig. 21. Using a philips screwdriver, slowly turn the adjusting screw until there is no clearance between the jig and audio/control head.

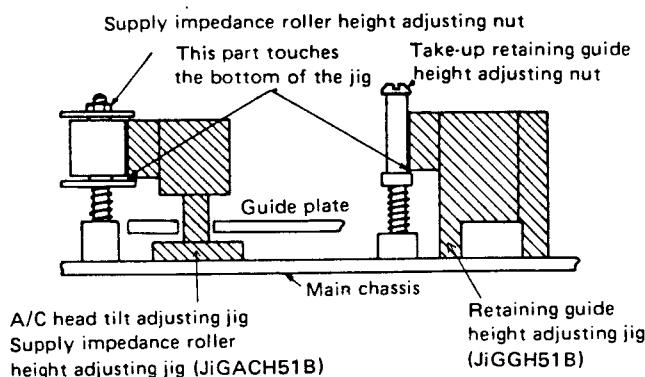


Figure 19.

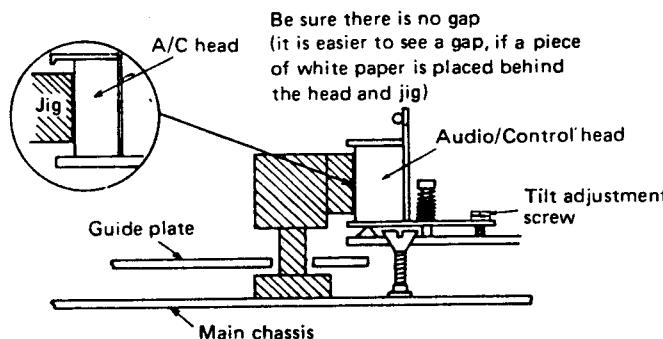


Figure 20.

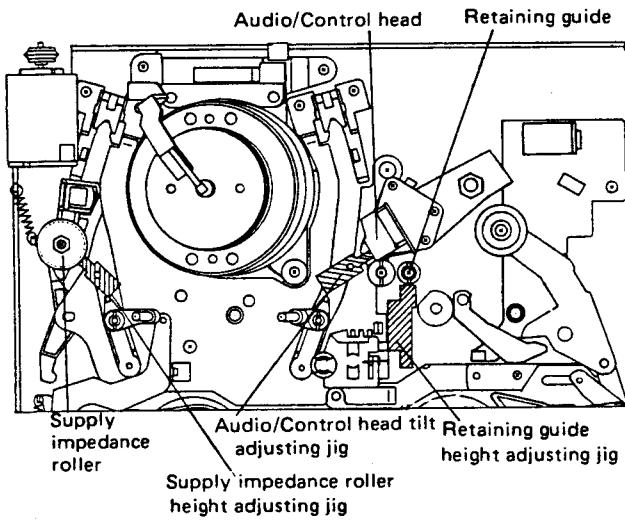


Figure 21.

## REPLACEMENT OF AUDIO/CONTROL HEAD

### Note:

After replacement, check for smooth tape movement. Under all circumstances avoid touching the head surface (indicated by "➡" in Fig. 23.).

### Replacement

1. Remove the leads from the audio/control head PWB.
2. Undo the tilt adjustment screw ⑥ with a philips screwdriver.
3. Remove the screw ⑤ (3P+8S) with a philips screwdriver.

4. Undo the audio/control head screw ④ with a philips screwdriver: pay attention to the spring between the guide plate and the audio/control head screw.
5. Unsolder the connector attached to the audio/control head PWB, and resolder this connector to the new audio/control head PWB. Then replace the audio/control head assembly with a new one.
6. Install the new audio/control head assembly so that the audio/control head plate is almost in parallel with the guide plate.
7. Adjust the audio/control head tilt angle as shown in Fig. 20.
8. Use a rough alignment tape and play it back. Using the specified box driver, turn the hexagon nut for audio/control head height adjustment so that the audio/control head has the height with regard to the tape as shown in Fig. 22.

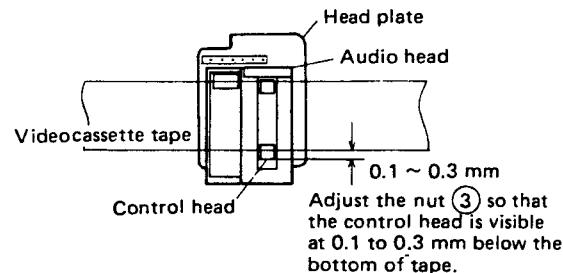


Figure 22.

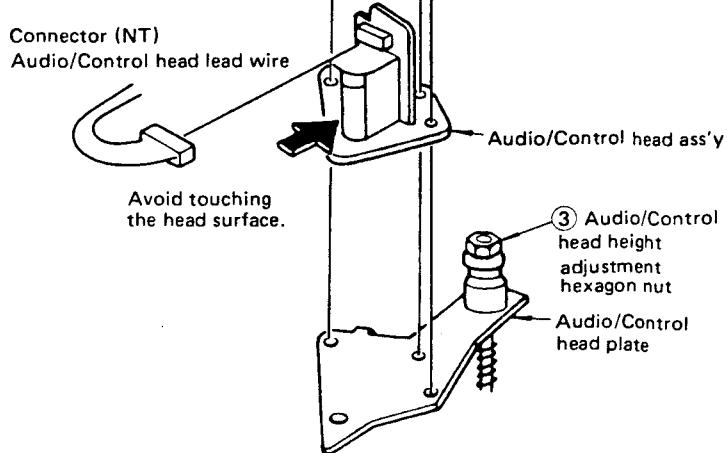
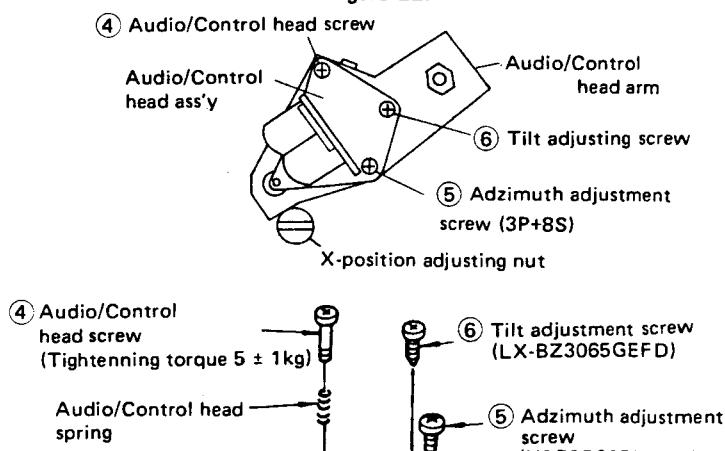


Figure 23.

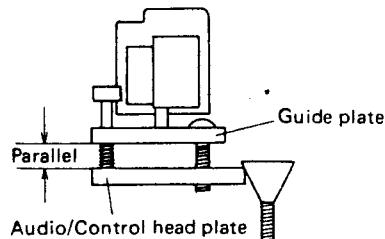


Figure 24.

**ADJUSTMENT OF TAPE TRAVEL**

1. Remove the cassette housing.
2. Making use of the master plane and reel disk height adjusting jig, check and adjust the reel disk height.
3. Set the supply impedance roller height adjusting jig and retaining guide height adjusting jig on the main chassis as shown in Fig. 19.
4. Set the tilt angle of the audio/control head as shown in Fig. 20.

**Note:**

The tilt angle of the audio/control head must be checked in this stage like in the case of replacement of the audio/control head.

5. After that, proceed with rough adjustment of the tape traveling.
  - a. Set the selection button at the auto position.
  - b. Connect an oscilloscope to TP303 (RF envelope) and TP304 (GND). Allow the RF output to be triggered by the head switching pulse of TP305.
  - c. Set an alignment tape (VRōCPSV) on the reel disk.

**Note:**

If the alignment tape not having a cassette housing is set on the reel disk, fix it with a weight of 400 to 650 g.

- d. Press the play button to get the unit in the playback mode.
- e. Observe the envelope of RF output on the oscilloscope, and check flatness of the envelope by rotation of the tracking control. If the envelope becomes almost flat when the tracking control is turned in either direction, the flatness of RF output is satisfied. If the flatness is poor, adjust the guide roller's height so that the envelope of RF output will be as flat as possible.

**Note:**

When adjusting the guide roller's height, be sure to use the specified guide roller adjusting screwdriver. Tighten the setscrew of the guide roller half its full turn, but as firmly as possible: take care not to overtighten it.

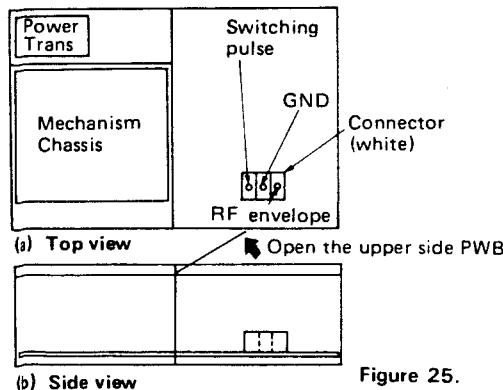


Figure 25.

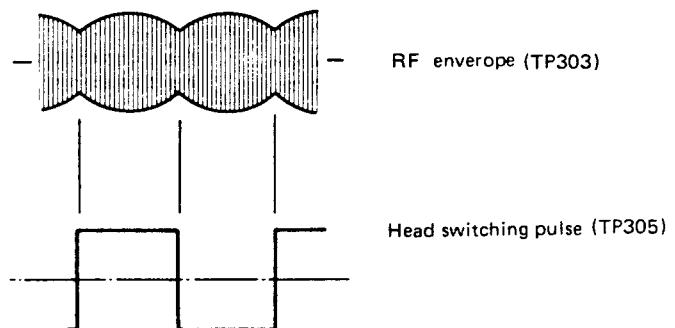


Figure 26.

6. When rough adjustment of the tape traveling is finished, set the retaining guide's height as follows to allow the tape to run along the retaining guide. See Fig. 27.

- a. Raise the retaining guide to create a crease on the tape at the lower flange of the retaining guide: to do this use the specified screwdriver. (JiGDRIVERH-4).

There may be a crease on the tape even before the retaining guide is manipulated. In this case, keep the guide as it is without moving it.

- b. Lower the retaining guide until the crease on the tape disappears completely; do not lower the guide exceeding this point.

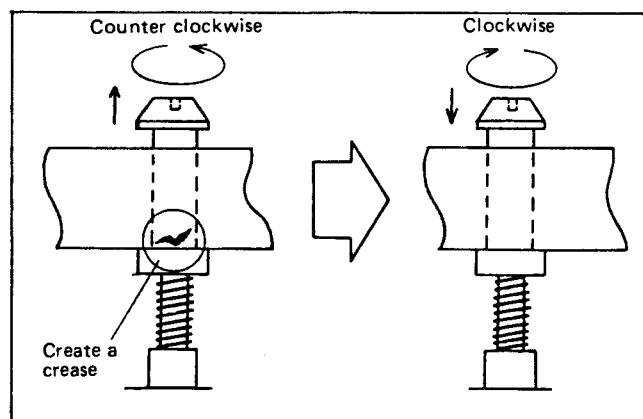


Figure 27.

7. After that, proceed with final adjustment of the retaining guide's height.

- a. Turn the adjusting nut (for the retaining guide's height) clockwise by 180° to lower the retaining guide accordingly.

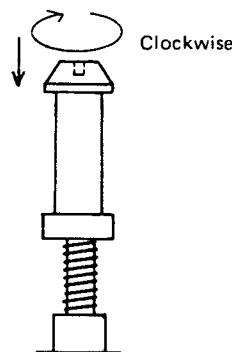


Figure 28.

8. After the final adjustment of the retaining guide's height, proceed with adjustment of the audio/control head's height and azimuth.
- Use an alignment tape (VRōCPSV) to play it back, and observe the audio output on an oscilloscope.
  - Rotate the azimuth adjusting screw ⑤ (3P + 8S) to obtain the maximum audio output level. Slowly rotate the audio/control head height adjusting hexagon nut ③ by the specified box driver to obtain the maximum audio output level.
  - After the retaining guide's height adjustment, again use an alignment tape (VRōCPSV) to play it back, and perform the adjustments in 5 before mentioned.
9. After the audio/control head adjustment, proceed with adjustment of the tape travel and X-position.
- Connect an oscilloscope to TP303 (RF envelope) and TP304 (GND). Allow the RF output to be triggered by the head switching pulse of TP305.
  - Play back an alignment tape (VRōCPSV).
  - Looking at the envelope on the oscilloscope, finely adjust the guide roller's height. Rotate the tracking control in either direction to adjust the guide roller's height to attain the best flatness of envelope. If the video tape is kept loose above or close to the helical lead position, the waveforms (envelopes) will arise as shown in Fig. 29. Follow the procedures shown below to obtain the best flatness of envelope.

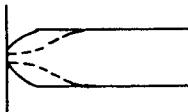
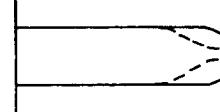
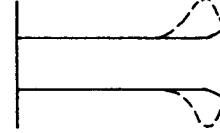
	When the tape is loose above the helical lead position.		When the tape is close to the helical lead position.	
	Drum inlet	Drum outlet	Drum inlet	Drum outlet
When the tracking control is turned clockwise				
When the tracking control is turned counterclockwise				
Adjustment procedures	Lower the guide roller (at the drum inlet) by turning it clockwise to make flat the envelope.	Lower the guide roller (at the drum outlet) by turning it clockwise to make flat the envelope.	First raise the guide roller (at the drum inlet) by turning it counter-clockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.	First raise the guide roller (at the drum outlet) by turning it counter-clockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.

Figure 29

**Notes:**

- The above adjustment is made at the switching point (CH-1 (Rch)).
- The envelope shown by broken lines in the above figure is caused in the extreme case of the tape being loose above or close to the helical lead position.

- After the adjustment, tighten the setscrew of the guide roller firmly: the guide roller is then kept in the unloading mode.
- Again playback an alignment tape (VRōCPSV) and check that the envelope of RF output signal is normal.

d. After the tape travel adjustment, proceed with X-position adjustment.

Set the tracking control at its preset position and turn the X-position adjusting nut (shown in Fig. 23) by using the X-position adjusting screwdriver to adjust the position of the audio/control head so that the envelope of the switching pulse (CH-1(Rch)) is at maximum.

After the X-position adjustment, adjust the tracking control so that the switching point becomes  $6.5 \pm 0.5H$ .

After the switching point adjustment, set the unit in the record mode using an alignment tape (VRōCPSV). Then check the flatness and audio level of envelope.

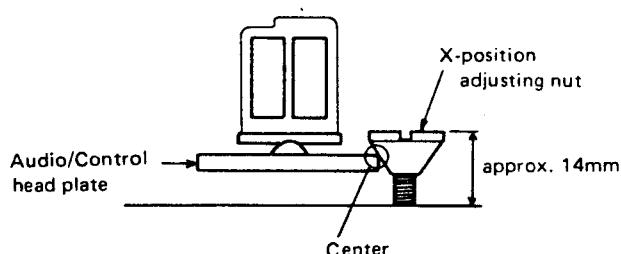


Figure 30.

## REPLACEMENT OF UPPER DRUM

### Note:

The engagement between the disk (outer diameter) and the upper drum (inner diameter) is very accurate in the order of microns, and due care should be paid to their replacement. Even a slight entry of foreign matter will affect the accuracy of their reassembly.

### Replacement

1. Unsolder the leads ① to ⑧ and remove them.
2. Remove two screws ⑨ [brass screws (W3P+9S) with plain washer] by using a philips screwdriver. Withdraw the upper drum with care not to allow it to be tilted, and replace it. Do not damage the outer surface of the disk. For withdrawal of the upper drum, use the jig (specialized for removing the upper drum) shown in Fig. 32.

### Notes:

1. Avoid touching the drum surface with bare hands.
2. Do not hit on the screws, when driving them in.

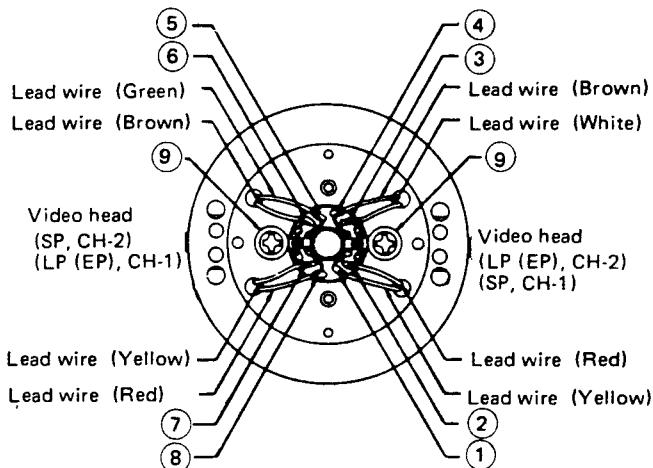


Figure 31.

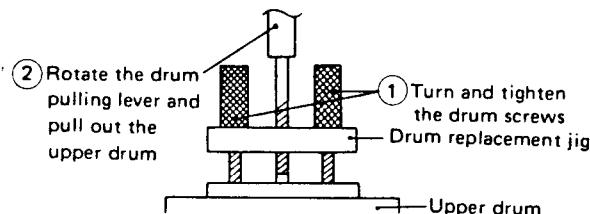


Figure 32.

## Reassembly

1. Set in place the new upper drum as shown in Fig. 31, and arrange the leads to be at their specified positions.

### Notes:

1. Before replacement the upper drum, check that there are no scratches or dust on the edge or the outer surface of the disk.
2. Before replacing, the upper drum, check that there are no scratches or dust on the edge or the inner surface of the upper drum.
3. On assembling these parts, slowly insert the upper drum into the disk with the utmost care, so that the upper drum will not be tilted.
4. When assembling these parts, do not allow foreign matter to come between them.
5. Do not use excessive force when driving in the screws.

2. Fasten the upper drum with two screws ⑨.
3. Solder the leads ① to ⑧ at their respective positions.

### Note:

Soldering should be performed quickly and carefully without touching the adjoining patterns.

4. After the replacement, be sure to check the tape travel and the followings.
  - a. Adjustment of the playback switching point.
  - b. Adjustment of the playback amplifier.
  - c. Checking and adjustment of the X-position.
  - d. Checking and adjustment of the tape travel at SP mode.

## REPLACEMENT OF THE MECHANICAL CONTROL UNIT

### Removal

1. Remove the switch leads (red, black and blue) from the reel sensor PWB.
2. Remove the E-ring.
3. Remove three B-tight screws.
4. Holding up the mechanism control unit angle, detach it from the main chassis.

### Reassembly

1. Remove the slit washer and relay gear B.
2. Align the shifter A and brake drive gear with each other.

#### Note:

There is an alignment hole on the main chassis, and each of the shifter A and brake drive gear is alone given an alignment hole. Use these holes for alignment of the parts; to facilitate this, remove the main brake spring and video search spring.

3. Remove the tension arm spring, and rotate the loading gear A and loading gear B fully in the arrow direction to get the unit in the unloading mode.
4. Remove the full erase head arm spring and move the arm in the indirection of arrow  $\rightarrow$  A
5. Rotate the brake cam of the mechanism control unit angle in the arrow direction, and bring the center of the alignment hole of the segment gear to that of the alignment hole of the supporting angle.
6. Attach the mechanism control unit angle to the main chassis; to facilitate this, move the shifter A rightward.
7. Secure the three B-tight screws.
8. Fit the E-ring.
9. Arrange the cam switch leads (red, black and blue) on the reel sensor PWB.
10. Fit the relay gear B and slit washer.
11. Replace the main brake spring and other springs to their original positions.

#### Notes:

1. When tightening the B-tight screw (LX-HZ3027GEFD), do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.
2. After the resassembly, check for proper alignment of each part and see that the mechanism is normally functioning in each mode.

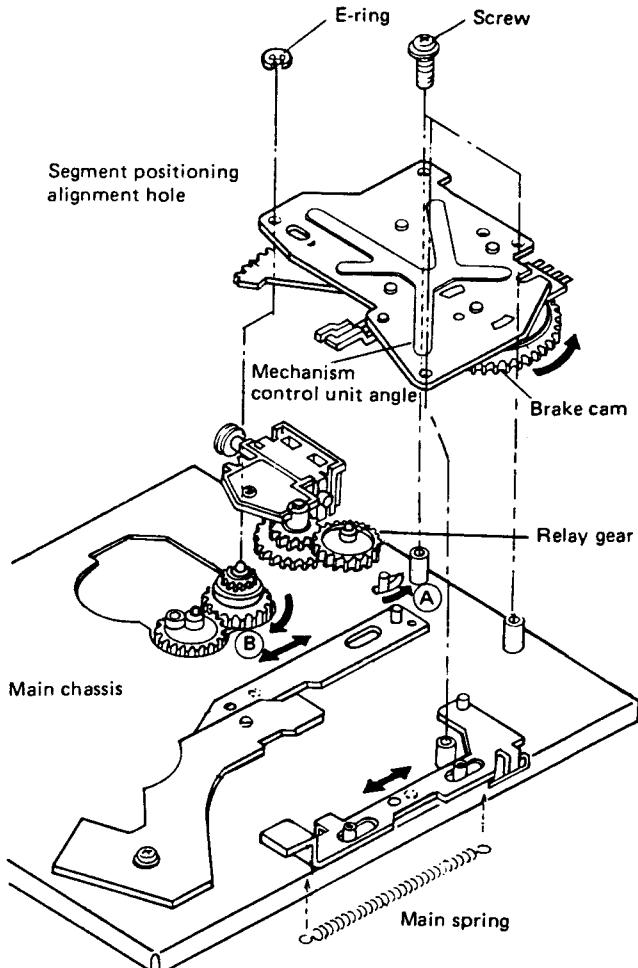


Figure 33.

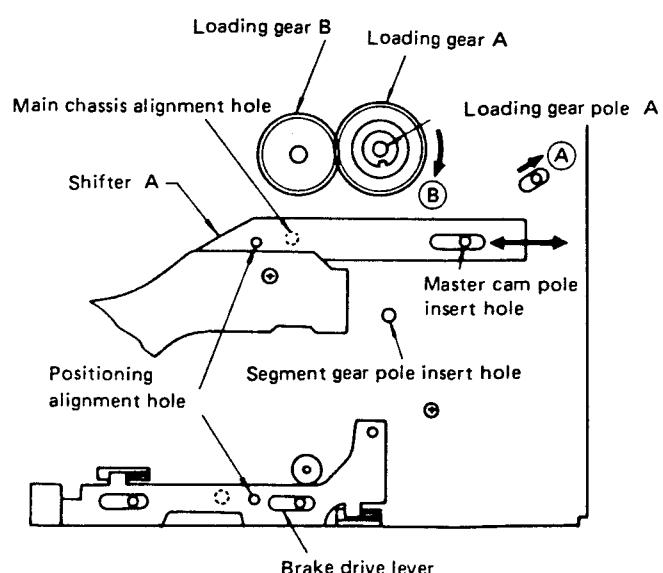


Figure 34.

## REPLACEMENT OF CAM SWITCH

### Removal

1. Remove the slit washer from the mechanism control angle unit and detach the brake cam.
2. Remove the cam switch from the mechanism control unit angle.

### Note:

Keeping the tab of the cam switch in the arrow direction, remove the cam switch from the mechanism control unit angle.

### Reassembly

1. Attach the cam switch to the brake cam.
2. Set the brake cam/cam switch assembly on the mechanism control unit angle.

### Note:

At the time, align the positioning mark (A) of the master cam and the positioning mark (B) of the brake cam with each other, and allow the selector lever to come into the groove of the brake cam.

3. Attach the slit washer to the pole of brake cam.

### Notes:

1. After the reassembly, rotate the brake in either direction to see that the selector lever is in the groove of the brake cam.
2. When replacing the master cam and/or brake cam, never fail to apply grease to its groove.

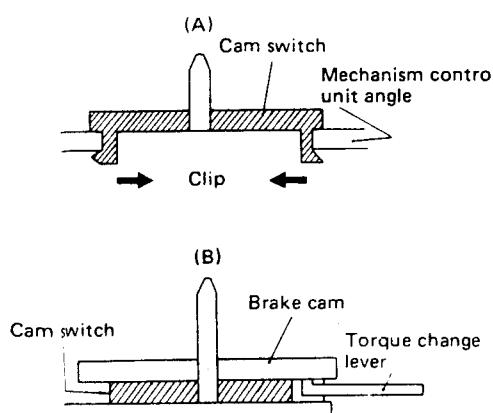
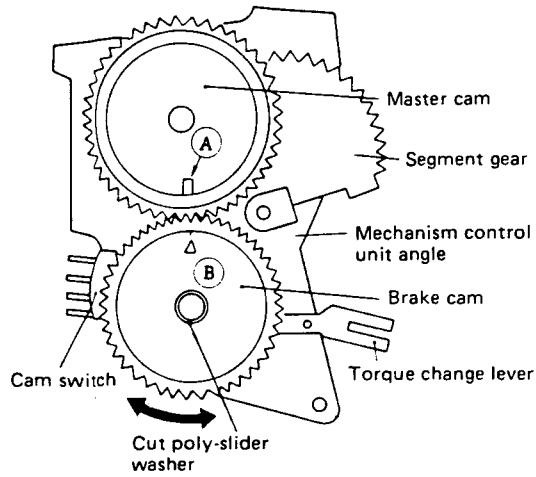


Figure 35.

## REPLACEMENT OF CAPSTAN DD (Direct Drive) MOTOR

### Removal

1. Remove the reel belt from the reel pulley on the reel drive unit.
2. Remove the leads and connector from the capstan DD (direct drive) motor control PWB. When removing the connector from the PWB, hold the PWB with your hand so that it won't be damaged with the shock resulting from the removal.
3. Remove the B-tight screws which secure the capstan DD motor control PWB with the main chassis.
4. Remove the cup tight screws which secure the capstan DD motor heat sink plate with the main chassis.
5. Remove three screws WSW 2.6P+6S (XBPSD26P06JSO) and detach the capstan DD motor from the main chassis.

### Reassembly

1. Position the capstan DD motor on the main chassis with care not to allow the capstan shaft to hit the main chassis. Then secure the capstan DD motor and main chassis with the three screws WSW 2.6P + 6S (XBPSD26P06JSO).
2. Set the capstan DD motor control PWB on the main chassis, and secure them with the B-tight screws.
3. Connect the leads and connector to the capstan DD motor control PWB.
4. Stretch the reel belt over the reel pulley of the reel drive unit. Be careful not to give a twist to the reel belt.

### Notes:

1. After installing the new capstan DD motor, be sure to let it run and see that the belt travels normally and also that there is nothing abnormal about the contact between the capstan DD motor and its pulley. And clean the reel belt.
2. Check and adjust the servo circuit.
3. When tightening the B-tight screw, do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.

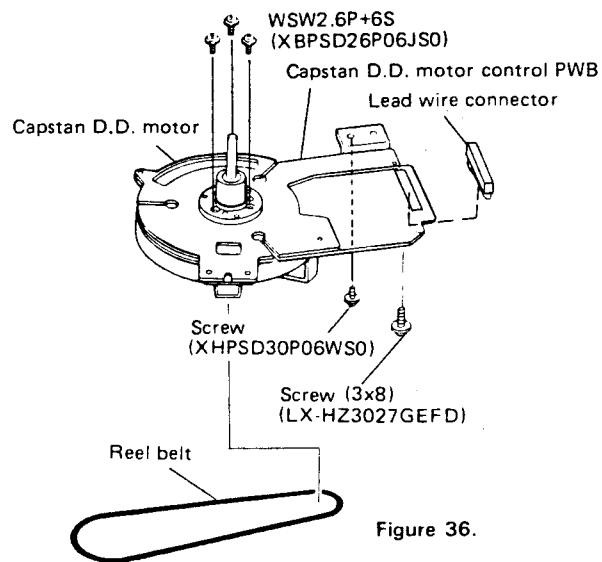


Figure 36.

## ADJUSTMENT AND CHECKING OF VIDEO SEARCH BRAKE LEVER

### Adjustment

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Press the rewind button to get the unit in the video search rewind mode, then unplug the power supply cord.
4. Loosen the screw (LX-HZ3031GEFD) to allow the video search brake control plate to move in either direction.
5. Provide a clearance of 0.2 to 0.5 mm between the video search brake control plate and video search brake lever; check the clearance visually. Then secure the video search brake control plate with the screw.

### Checking

1. Set the unit in the record and/or playback mode, and check that the video search brake lever is not in contact with the take-up reel disk.
2. Set the unit in the video search rewind mode, and check that its back tension is as specified. (See page 20).

### Note:

1. If the video search brake lever is kept in contact with the take-up reel disk when the unit is in the record and/or playback mode, readjust the back tension in the video search rewind mode if it is less than the specified value.
2. If the torque of rewind back tension in video search mode is more than specified value, replace the video search brake lever.

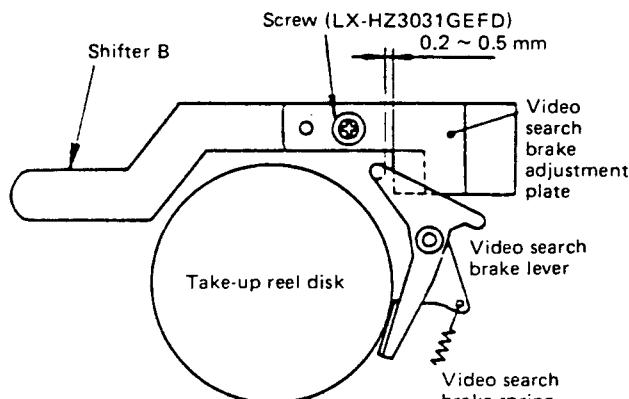


Figure 37.

## REPLACEMENT OF THE LOADING MOTOR

### Replacement

1. Remove four screws securing the main chassis to the plastic frame.
2. Disconnect the drum DD (Direct Drive) motor lead connector and the loading motor relay lead NF connector.
3. Remove the loading belt.
4. Remove the cup-tight screw ⑥. Tilt the main chassis for easy removal.
5. Remove two screws ② and remove the loading motor from the loading motor holder.
6. Remove the loading motor PWB ⑤.
7. Replace the loading motor along with the pulley.

### Notes:

1. Check that the space between the motor and the loading motor pulley is  $4.5 \pm 0.1$  mm.
2. After installing the loading motor, be sure to rotate the loading motor and check for smooth movement.

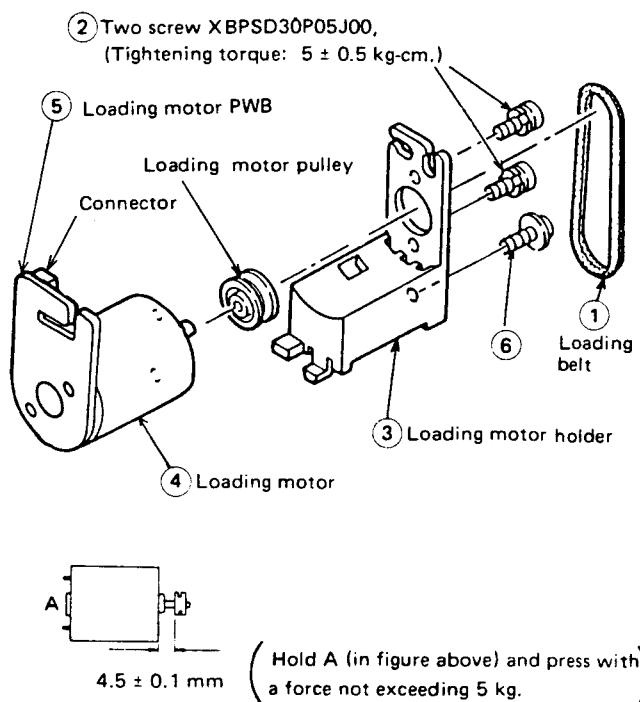


Figure 38.

## REPLACEMENT OF DD (Direct Drive) MOTOR

### Removal

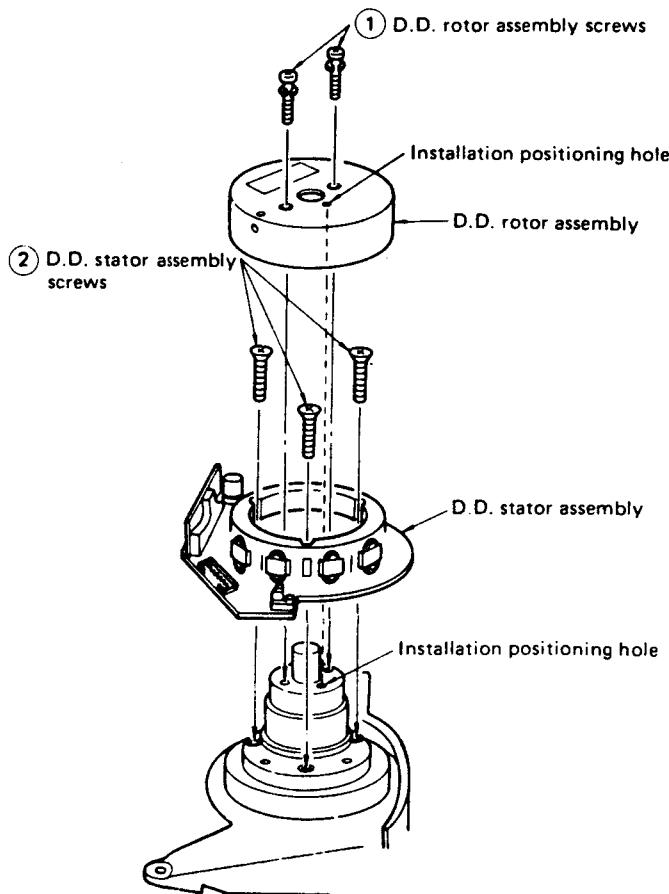
1. Remove two screws ①, using a philips screwdriver, which hold the direct-drive rotor assembly.
2. Remove the direct-drive rotor assembly by pulling it straight out.
3. Remove three brass screws ②, using a philips screwdriver, which hold the direct-drive stator assembly.
4. Remove the direct-drive stator assembly by pulling it straight out.

**Assembly**

1. Place the direct-drive stator assembly on top of the lower drum.
2. Secure the direct-drive stator with the three brass screws ② by using a philips screwdriver.
- Note:**  
Be careful not to scratch the core, winding or hall device.
3. Install the direct-drive rotor assembly onto the drum shaft.
- Note:**  
Press it down straight and observe its setting direction as shown in Fig. 39.
4. Secure the direct-drive rotor assembly by the screw ①.
5. Apply glyptal to the screws ①.
6. After the replacement of DD motor adjust the playback switching point.

**Notes:**

1. Be careful not to damage the upper drum or the video head.
2. Do not let tools on the DD rotor assembly contact or hit the hall device.



**Note 1:** Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.

Figure 39.

**ADJUSTMENT OF PLAYBACK SWITCHING POINT****Caution:**

This mode is applicable to both PAL and NTSC system, and it is needed to prepare two alignment tapes, PAL (VRōCPSV) and NTSC (VRōATSV), for adjustment of the playback switching point.

**Adjustment**

1. Use a PAL alignment tape (monoscope) to play it back, then adjust R753 and/or R755 (switching point control) so that the output is  $6.5 \pm 0.5H$ .
2. Use a NTSC alignment tape (monoscope) to play it back, then adjust R791 and/or R793 (switching point control) so that the output is  $6.5 \pm 0.5H$ .

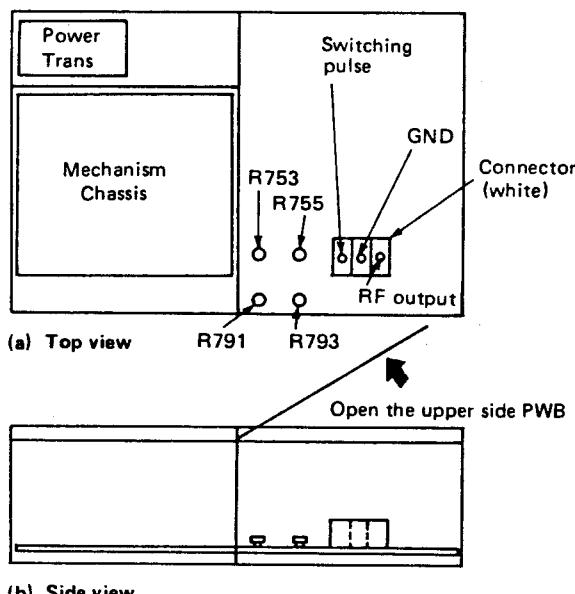


Figure 40.

## **ADJUSTMENT OF ELECTRICAL CIRCUITS**

In most cases, necessity for electrical circuits will arise from replacement of mechanical parts including the video head. Before starting adjustment of electrical circuits, check that mechanical operation of the equipment is complete (the mechanisms are adjusted completely).

- **Instruments**

- Colour monitor TV
  - DC regulated power supply
  - VTVM
  - Oscilloscope
  - Audio generator
  - Colour bar generator
  - Alignment tape
  - Frequency counter
  - Blank video tape (VHS)

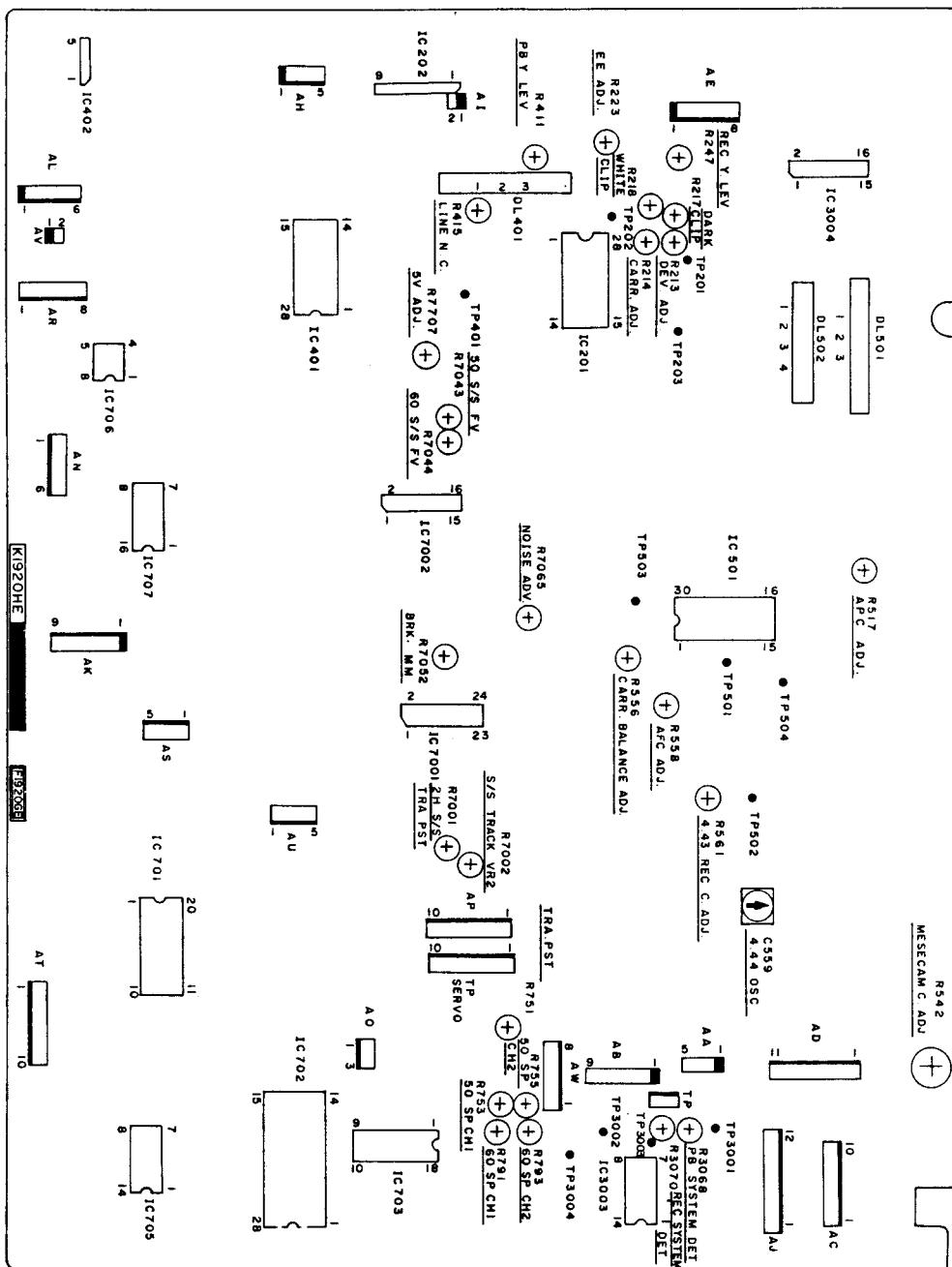
If the equipment fails electrically, locate a defect or defects first of all using instruments. Then repair or replace parts and make adjustment by the procedures described below.

When required instruments are not available, do not move controls indiscriminately.

## **ADJUSTMENT OF SERVO, Y/C CIRCUIT**

- Test Point Layout

(SERVO, Y/C PWB) - DUNKT1920HE -



**Figure 41.**

## ■ ADJUSTMENT OF SERVO TRICK CIRCUIT

### Cautions

This adjustment consists of STEP 1 to STEP 20 and should be done, in principle, step by step thoroughly from the beginning to the end. If you, however, want to start the adjustment from the step on the way, observe the following points.

- In STEP 1 "Adjustment of PC 5.1V", if the checking voltage is largely apart from the specified value ( $5.1 \pm 0.1V$ ), that is, if the difference between both values is 0.3V or more, it is needed to take all the procedures from STEP 1 to STEP 20.
- For the CH-1 and CH-2 phase adjustments from STEP 4 to STEP 7, STEP 10 and STEP 11, the adjustment should be performed first for PAL system and then for NTSC system.
- For the adjustments of the false vertical sync from STEP 14 to STEP 16, be sure to check beforehand that the CH-1 and CH-2 phase adjustments (from STEP 4 to STEP 7, STEP 10 and STEP 11) have been properly made.
- For the adjustments of the brake pulse in the slow/still mode in STEPS 18 and 19, the adjustment should be performed first for PAL system and then for NTSC system.

### STEP 1.

#### Adjustment of PC 5.1V.

1. Put the unit in the PAL playback mode.
2. Connect a VTVM to TP705 and TP704, and adjust R7707 (PC 5V control) so that the VTVM reads  $5.1 \pm 0.1V$ .

### STEP 2.

#### Adjustment of PAL tracking preset

1. Put the unit in the PAL playback mode, using an alignment tape (VRōCPSV).
2. Observe the output of TP702 (tracking) with an oscilloscope.
3. Adjust R751 (tracking preset control) so that the square-wave output is at the specified level ( $17.2 \pm 1.0\text{ msec}$ ) from the rising edge to the falling edge.

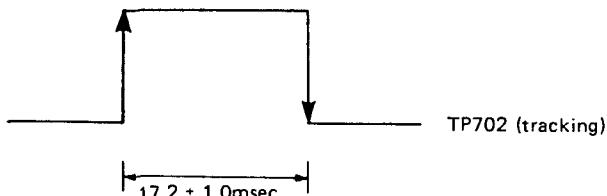


Figure 42.

### STEP 3.

#### Checking of NTSC tracking preset

1. Put the unit in the NTSC playback mode, using an alignment tape (VRōATSV).
2. Observe the output of TP702 (tracking) with an oscilloscope.
3. Check that the square-wave output is at the specified level ( $14.4 \pm 1.0\text{ msec}$ ) from the rising edge to the falling edge.

#### Note:

If the specified level is not here obtained, readjust the PAL tracking preset in STEP 2 above and recheck the value in this step.

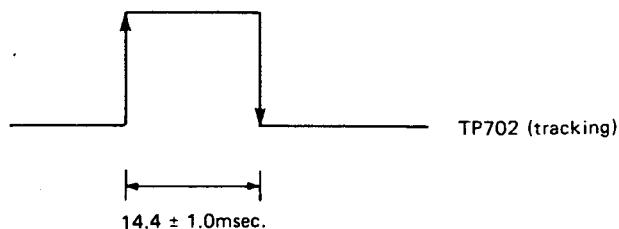


Figure 43.

### STEP 4.

#### Adjustment of PAL CH-1 and CH-2 phase (SP mode)

1. Put the unit in the PAL playback mode, using an alignment tape (VRōCPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using the plus sync slope of oscilloscope, adjust R753 (3H SP CH-1 phase control) so that the output level is at  $6.5 \pm 0.5\text{H}$ .
4. Using the minus sync slope of oscilloscope, adjust R755 (3H SP CH-2 phase control) so that the output level is at  $6.5 \pm 0.5\text{H}$ .

### STEP 5.

#### Adjustment of PAL CH-1/CH-2 phase relative error

1. Put the unit in the PAL playback mode, using an alignment tape (VRōCPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within  $\pm 0.5\text{H}$ .
4. If the variation of CH-1 and/or CH-2 is not out of the specified range ( $\pm 0.5\text{H}$ ), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

#### Note:

If the CH-1/CH-2 phase relative error is greatly out of the specified range ( $\pm 0.5\text{H}$ ), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

**STEP 6.**

- Adjustment of NTSC CH-1 and CH-2 phase (SP mode)**
1. Put the unit in the NTSC playback mode, using an alignment tape (VRōATSV).
  2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
  3. Using the plus sync slope of oscilloscope, adjust R791 (2H SP CH-1 phase control) so that the output level is at  $6.5 \pm 0.5H$ .
  4. Using the minus sync slope of oscilloscope, adjust R793 (2H SP CH-2 phase control) so that the output level is at  $6.5 \pm 0.5H$ .

**STEP 7.**

- Adjustment of NTSC CH-1/CH-2 phase relative error**
1. Put the unit in the NTSC playback mode, using an alignment tape (VRōATSV).
  2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
  3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within  $\pm 0.5H$ .
  4. If the variation of CH-1 and/or CH-2 is out of the specified range ( $\pm 0.5H$ ), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

**Note:**

If the CH-1/CH-2 phase relative error is greatly out of the specified range ( $\pm 0.5H$ ), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

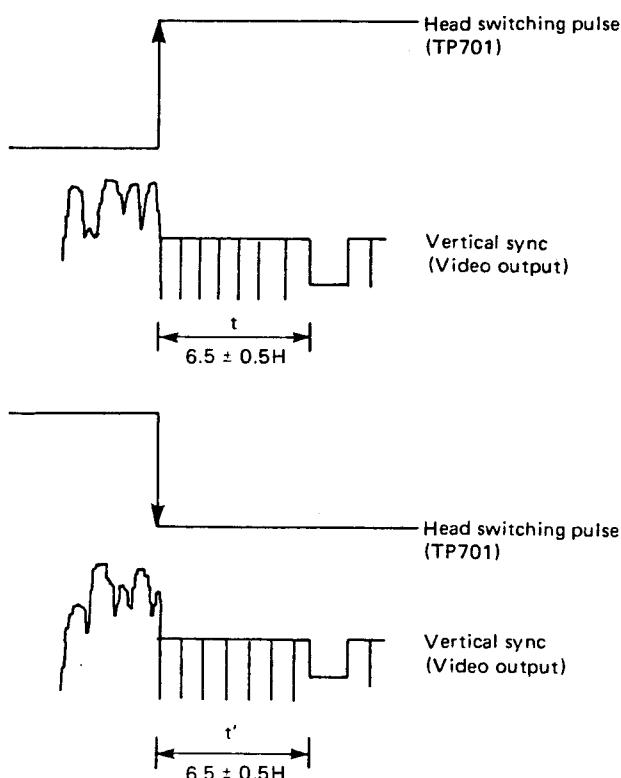


Figure 44.

**STEP 8.**

- Checking of PAL recording phase (SP mode)**

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at  $6.5 \pm 2.0H$ .

**STEP 9.**

- Checking of NTSC recording phase (SP mode)**

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at  $6.5 \pm 2.0H$ .

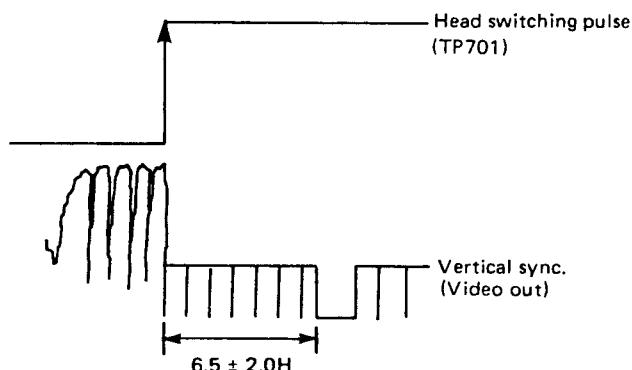


Figure 45.

**STEP 10.**

- Adjustment of PAL CH-1 and CH-2 phase (LP mode)**

1. Short TP705 (power control 5V) and TP710 (LP adj.)
2. Playback an alignment tape (VRōCPSV) in the PAL playback mode. Then observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using an oscilloscope as STEP 4. PAL SP mode, adjust R7736 (3H LP CH-1 phase control) and R7734 (3H LP CH-2 phase control) so that the output levels are at  $6.5 \pm 0.5H$  respectively.

**Note:**

R7736 and R7734 are located in the Tuner IF/Audio PWB.

4. As STEP 5. SP mode, check if the CH-1/CH-2 phase relative error is within  $\pm 0.5H$ . If the CH-1/CH-2 phase relative error is out of the specified range ( $\pm 0.5H$ ), readjust the phase.
5. After adjustment, remove TP705 and TP710 short.

**STEP 11.****Adjustment of NTSC CH-1 and CH-2 phase (LP mode)**

1. Short TP705 (power control 5V) and TP710 (LP adj).
2. Playback an alignment tape (VRÖATSV) in the NTSC playback mode. Then observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using an oscilloscope as STEP 6. NTSC SP mode, adjust R7740 (2H LP CH-1 phase control) and R7738 (2H LP CH-2 phase control) so that the output levels are at  $6.5 \pm 0.5H$  respectively.

**Note:**

R7740 and R7738 are located in the Tuner IF/ Audio PWB.

4. As STEP 7. SP mode, Check if the CH-1/CH-2 phase relative error is within  $\pm 0.5H$ . If the CH-1/CH-2 phase relative error is out of the specified range ( $\pm 0.5H$ ), readjust the phase.
5. After adjustment, remove TP705 and TP710 short.

**STEP 12.****Checking of PAL recording phase (LP mode)**

1. Set SW8116 (record speed selector) in the LP mode, then record a PAL video signal and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at  $6.5 \pm 2.0H$ .

**STEP 13.****Checking of NTSC recording phase (LP mode)**

1. Set SW 8116 (record speed selector) in the LP mode, then record a NTSC video signal and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at  $6.5 \pm 2.0H$ .

**STEP 14.****Adjustment of PAL false vertical sync in the slow/still mode.****Note:**

Before this adjustment, be sure to check that the adjustment of PAL CH-1/CH-2 relative error in STEP 5 has been properly done.

1. Put the unit in the PAL playback mode, using an E-180 tape.
2. Put the unit in the PAL still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7043 (3H slow/still FV sync. control) so that the output level is shown in Fig. 46.
4. Adjust R7043 so that there is the least of noise on TV monitor.

**STEP 15.****Checking of PAL false vertical sync in the video search mode.**

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Put the unit in the video search mode.
3. Check that the horizontal raster does not move up and down so noticeably on TV monitor.

**STEP 16.****Adjustment of NTSC false vertical sync in the slow/still mode****Note:**

Before this adjustment, be sure to check that the adjustment of NTSC CH-1/CH-2 relative error in STEP 7 has been properly done.

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Put the unit in the still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7044 (2H slow/still FV sync. control) so that the output level is as shown in Fig. 46.
4. Adjust R7044 so that there is the least deviation of noise on TV monitor.

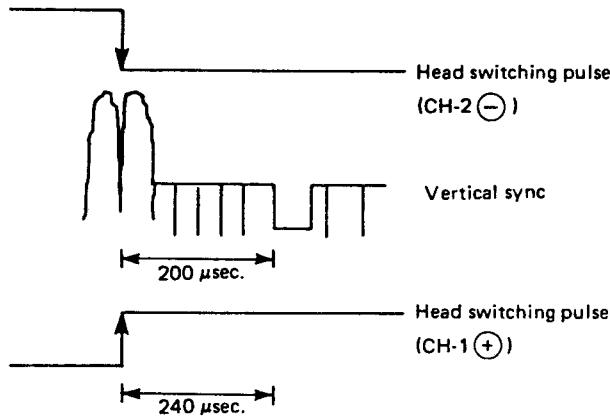


Figure 46.

**Step 17.****Brake adjustment in the slow/still mode****Caution:**

This adjustment is necessary for both NTSC and PAL modes, and it should be performed for NTSC mode first and then for PAL mode.

1. Record a video signal on an E-180 tape, and play it back.
  2. Put the unit in the frame advance mode.
  3. Observe the output of TP709 and TP708 with an oscilloscope.
  4. Adjust R7052 (slow/still brake MM control) so that the output of brake pulse (tracking) is within the specified range as shown in Fig. 47.
- Specified value outline; NTSC =  $17.0 \pm 1.0$  msec  
PAL =  $11.0 \pm 2.0$  msec

5. Adjust R7052 so that the output waveform of the capstan frequency generator's signal available next to the brake pulse (tracking) becomes as shown below:

Part (a) : Adjust to the minimum width.

Part (b) : Adjust to the minimum amplitude.

6. Put the unit in the slow mode.

7. Keeping the unit in the slow mode, and check that the waveform at the parts (a) and (b) are not so much affected.

#### Note:

The slow button and the frame advance button are located in the remote control unit.

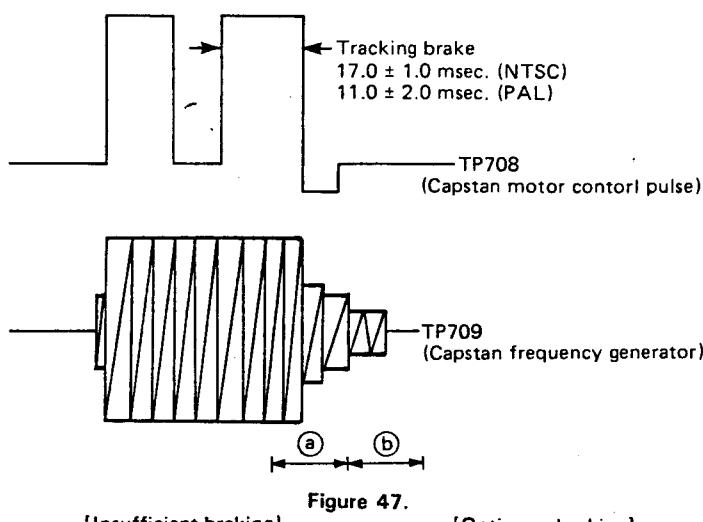
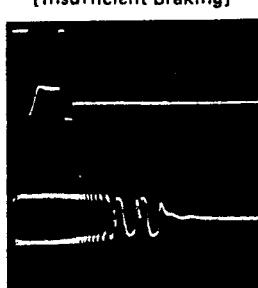
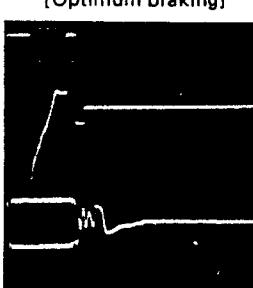


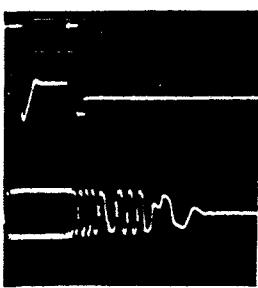
Figure 47.



(a) Speed is too slow.



(b) Since the braking is optimum and the tape speed normally slowed down the noise bars are not deviated.



(c) Noise bars are deviated.

Figure 48.

#### STEP 18.

#### Adjustment of brake pulse in the NTSC slow/still mode (SP mode)

1. Record a NTSC video signal on an E-180 tape, and play it back.

2. Adjust R7001 (2H slow/still tracking preset control) so that the triangular-wave output is at the specified level (38 msec.) from the rising edge to the falling edge. See Fig. 49.

3. Set the tracking control at the center click position.

4. Adjust R7001 so that there appears no noise bar on TV monitor, or the noise, if present, becomes almost the same in up and down directions.

#### Note:

Here, the tracking control may be adjusted in addition to R7001; in this case, however, do not move the tracking control by more than 2/10 of turn from the center click position in either direction.

5. Put the unit in the playback mode, using an alignment tape (VR<sub>0</sub>ATSV).

6. Put the unit in the frame advance mode and/or the still mode.

7. Adjust R7001 so that there appears no noise bar on TV monitor, or the noise, if present, becomes almost the same in up and down directions.

#### Note:

Here, the tracking control may be adjusted in addition to R7001; in this case, however, do not move the tracking control by more than 3/10 or turn from the center click position in either direction.

#### STEP 19.

#### Adjustment of brake pulse in the PAL slow/still mode (SP mode)

1. Record a PAL video signal on an E-180 tape, and play it back.

2. Adjust R7002 (3H slow/still tracking preset control) so that the triangular-wave output is at the specified level (38 msec.) from the rising edge to the falling edge. See Fig. 49.

3. Set the tracking control at the center click position.

4. Adjust R7002 so that there appears no noise bar on TV monitor, or the noise, if present, becomes almost the same in up and down directions.

#### Note:

Here, the tracking control may be adjusted in addition to R7002; in this case, however, do not move the tracking control by more than 2/10 of turn from the center click position in either direction.

5. Put the unit in the playback mode, using an alignment tape (VR<sub>0</sub>CPSV).

6. Put the unit in the frame advance mode and/or the still mode.

7. Adjust R7002 so that there appears no noise bar on TV monitor, or the noise, if present, becomes almost the same in up and down directions.

#### Note:

Here, the tracking control may be adjusted in addition to R7002; in this case, however, do not move the tracking control by more than 3/10 of turn from the center click position in either direction.

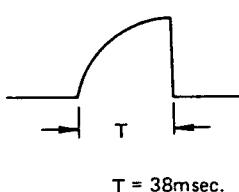


Figure 49.

**STEP 20.****Adjustment of noise advance in the NTSC still mode (LP mode)**

1. Set SW8116 (record speed selector) in the LP mode, then record a NTSC video signal and play it back.
2. Put the unit in the slow mode. Check that the noise bar moves from up to down on TV monitor.
3. Adjust R 7065 (noise advance control) so that the noise bar appears 4 to 6 times until it moves from up to down on TV monitor.

**Note:**

NTSC LP still noise advance is not always constant. For capstan DD motor is acted on minute current.

**Reference:**

In the case of observing the output waveform with an oscilloscope.

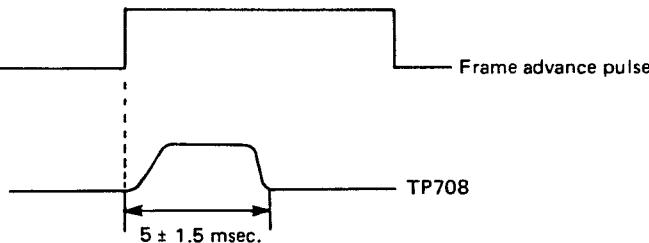


Figure 50.

**■ ADJUSTMENT OF Y/C CIRCUIT****Adjustment of E-E level****Note:**

The video output must be terminated with a resistor of 75 ohms.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit. And observe the video output with an oscilloscope.
3. Adjust R223 (E-E level control) so that the level becomes  $1.0 \pm 0.05\text{Vp-p}$ .

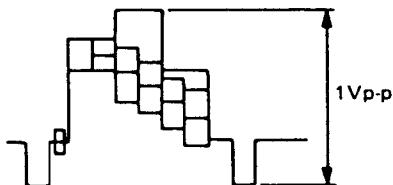


Figure 51.

**Adjustment of FM carrier and deviation****Notes:**

- a. Do not perform this adjustment except after replacement of IC201 or when the carrier control (3.8MHz) or deviation control (1.0MHz) has been adjusted improperly.
  - b. Before this adjustment, make sure that the E-E level and playback brightness level have been adjusted as specified.
1. Set the input selector switch in the AUX mode. (with the AUX terminal given no signal).
  2. Put the unit in the PAL SP record mode.
  3. Connect a frequency counter to TP202, and adjust R214 (carrier control) so that the counter reads  $3.8 \pm 0.05\text{MHz}$ .
  4. Apply a colour bar signal (stair-step waveform), then record and play it back.
  5. Connect a 75 ohm resistor between the video output and ground, and observe the video output with an oscilloscope.
  6. Adjust R213 (deviation control) so that the video playback level becomes  $1.0 \pm 0.05\text{Vp-p}$ . If the level is below  $0.95\text{Vp-p}$ , turn the R213 counterclockwise. If the level is over  $1.05\text{Vp-p}$ , turn the R213 clockwise.

**Adjustment of dark clip and white clip**

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit.
3. Observe the output of TP201 with an oscilloscope, and adjust R218 (white clip control) so that white output overshoot is within  $70 \pm 5\%$ , and then adjust R217 (dark clip control) so that dark output overshoot is within  $50 \pm 5\%$ .

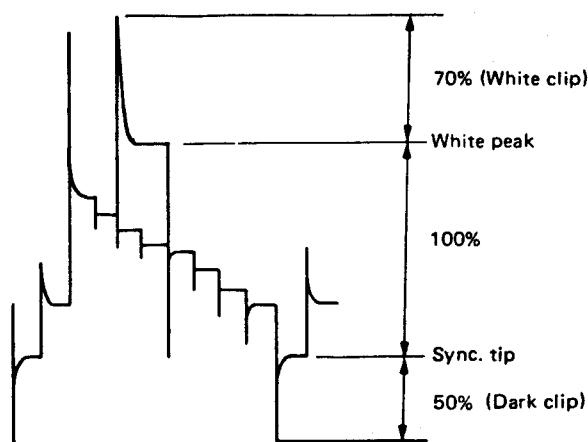


Figure 52.

**Adjustment of automatic phase control (APC)**

1. Put the unit in the PAL SP playback mode, using an alignment tape (VR<sub>O</sub>CPSV).
2. Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP504.
3. Adjust R517 (APC control) so that the counter reads 4.433619 MHz.

**Adjustment of automatic frequency control (AFC)****Note:**

Connect a short clip between TP502 and TP503.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP501.
3. Adjust R558 (AFC control) so that the counter reads  $625 \pm 5\text{kHz}$ .

**Adjustment of 4.44MHz oscillation**

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit, and put the unit in the E-E mode.
3. Connect a frequency counter to TP502.
4. Adjust C559 (4.44MHz oscillation trimmer) so that the counter reads  $4.435572\text{MHz} \pm 15\text{Hz}$ .

**Adjustment of carrier balance**

1. Put the unit in the PAL SP playback mode, using an alignment tape (VR<sub>O</sub>CPSV).
2. Apply a colour bar signal (stair-step waveform) to the unit.
3. Observe the video output using an oscilloscope, and adjust R556 (carrier balance control) so that the carrier leak of waveform is minimum.

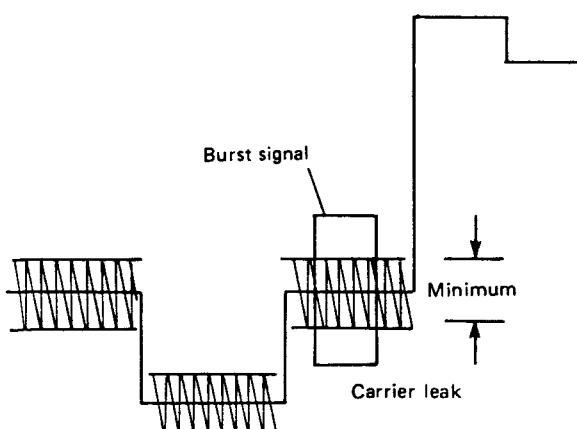


Figure 53

**Adjustment of record current****a) In the case of PAL 4.43MHz****Note:**

Before the adjustment, turn R247 (record luminance level control) to minimize the record current.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of oscilloscope to TP301 and the minus sync slope to TP302 and observe the output waveforms available there.
4. Adjust R561 (record chroma level control) so that the output level is within  $27.5 \pm 2.5\text{mV}$ .

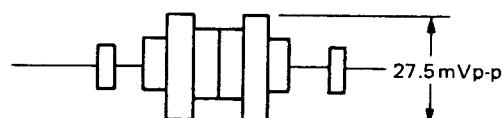


Figure 54.

**b) In the case of NTSC 3.58MHz**

(refer to chroma circuit, Fig. 75)

**Note:**

Before the adjustment, turn R247 (record luminance level control) to minimize the record current.

1. Put the unit in the NTSC SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of the oscilloscope to TP301 and the minus sync slope to TP302, and observe the output waveforms available there.
4. Adjust R5810 (3.58MHz record chroma level control) so that the output level is within  $35 \pm 2.0\text{mV}$ .

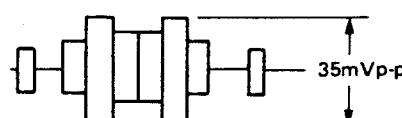


Figure 55.

**c) In the case of SECAM**

(refer to chroma circuit, Fig. 75)

**Note:**

Before the adjustment, turn R247 (record luminance level control) to minimize the record current

1. Put the unit in the SECAM SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of oscilloscope to TP301 and the minus sync slope to TP302, and observe the output waveforms available there.
4. Adjust R5813 (SECAM record chroma level control) so that the output level is within  $20 \pm 2\text{mV}$ .

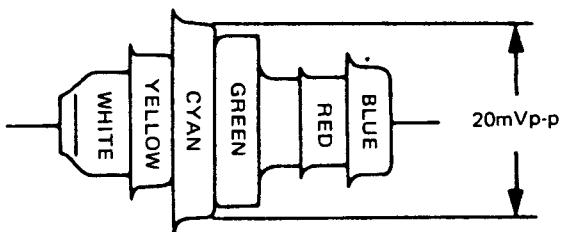


Figure 56.

**d) Adjustment of record luminance level**

1. Put the unit in the PAL SP playback mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect the plus sync slope of oscilloscope to TP301 and the minus sync slope to TP302, and observe the output waveforms available there.
4. Adjust R247 (record luminance level control) so that the output level is within  $130 \pm 10\text{mV}$ .

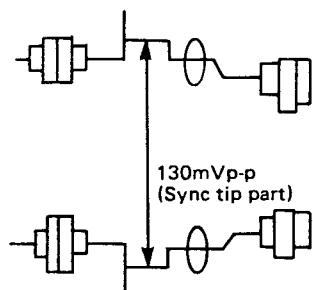


Figure 57.

**Adjustment of playback luminance level****Note:**

The video output must be terminated with a resistor of 75 ohms.

1. Put the unit in the PAL SP playback mode, using an alignment tape (VRöCPSV).
2. Observe the video output with an oscilloscope.
3. Adjust R411 (playback luminance level control) so that the output level is  $1.0 \pm 0.05\text{Vp-p}$ .

**Adjustment of M/E (Middle East) SECAM chroma level**

1. Apply a SECAM colour signal to the unit, record it with an E180 tape and then play it back.
2. Adjust R542 (M/E SECAM chroma level control) to attain the best colour picture on TV monitor.

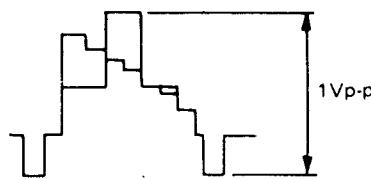


Figure 58.

**Adjustment of recording system detector**

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal to the unit.
3. Connect a VTVM between TP3001 (+ side) and TP3003.
4. Adjust R3070 (rec. system detector control) so that the VTVM reads  $0.3 \pm 0.05\text{VDC}$ .

**Adjustment of playback system detector**

1. Put the unit in the PAL SP playback mode, using an alignment tape (VRöCPSV).
2. Connect a VTVM between TP3002 (- side) and TP3004.
3. Adjust R3068 (playback system detector control) so that the VTVM reads  $0.5 \pm 0.05\text{VDC}$ .

**Adjustment of line noise canceller**

1. Playback a NTSC tape (pre-recorded the colour bar signal) in the EP mode.
2. Observe the output at TP401 using an oscilloscope (external trigger TP5705) and adjust R415 (line noise canceller control) so that the noise is spread evenly and not tilted as shown in Fig. 59.

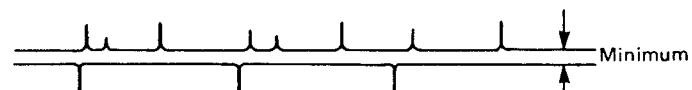


Figure 59.

## ADJUSTMENT OF CHROMA CIRCUIT

### • Test point layout

(CHROMA PWB) -DUNTK1732HE-

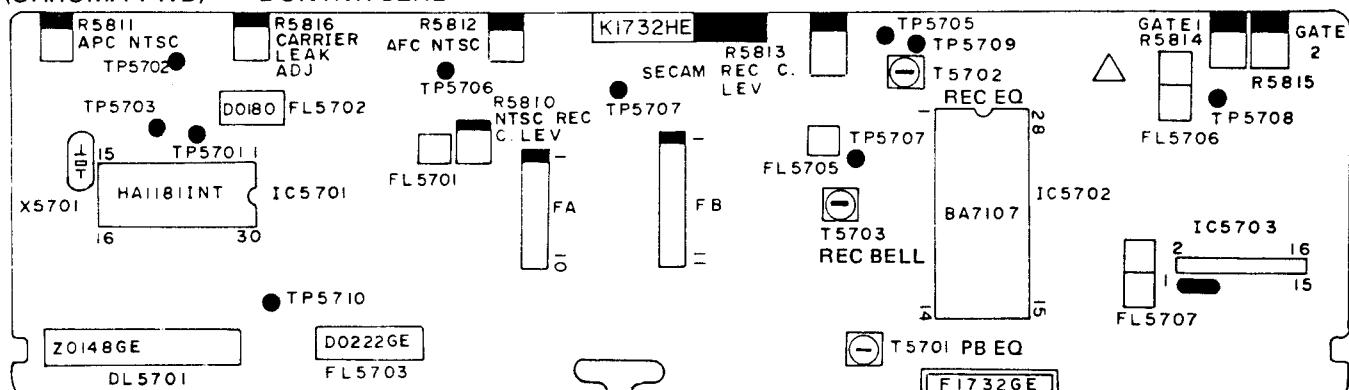


Figure 60.

### ■ ADJUSTMENT OF NTSC 3.58 CIRCUIT

#### Adjustment of AFC (R5812)

1. Apply a NTSC colour bar signal to the video input terminal.
2. Put the unit in the SP stop mode, and short TP5703 and TP5706.
3. Connect a frequency counter to TP5701 and adjust R5812 so that the counter reads 629 kHz.

#### Adjustment of APC (R5811)

1. Playback a NTSC tape (pre-recorded) in the SP mode and connect a frequency counter to TP5703.
2. Adjust R5811 so that the counter reads 3.579545 MHz ( $\pm 50$  kHz).

#### Adjustment of carrier leak (R5816)

1. Playback a NTSC tape (pre-recorded) in the SP mode and connect an oscilloscope to TP5710.
2. Adjust R5816 so that there is the least of beating in the colour signal on oscilloscope.

#### Adjustment of colour record current (R5810)

1. Connect an oscilloscope to TP301 and TP302 (GND) of the head amplifier, and apply a NTSC colour bar signal to record it.
2. Set R247 (record luminance level control) at the minimum position and adjust R5810 so that the output is 35mVp-p.
3. Return R247 to the position which gives the output of 130mVp-p.

### ■ ADJUSTMENT OF SECAM CIRCUIT

#### Adjustment of record bell filter (T5703)

1. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
2. Adjust T5703 so that the output of chroma signal becomes flat as shown in Fig. 61.

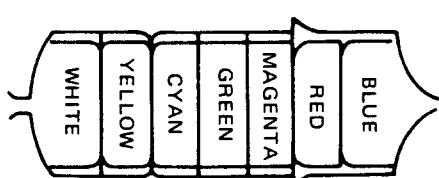


Figure 61.

#### Adjustment of record gate (R5814, R5815)

1. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
2. Connect an oscilloscope to TP5707 and TP5705, and check that the output of chroma signal is as shown in Fig. 62.
3. Adjust R5814 and R5815 so that the intervals  $T_1$  and  $T_2$  become  $2\mu$ sec and  $4.8\mu$ sec respectively.

#### Adjustment of record equalizer (T5702)

Adjust T5702 so that the output at the point ② is as shown in Fig. 62.

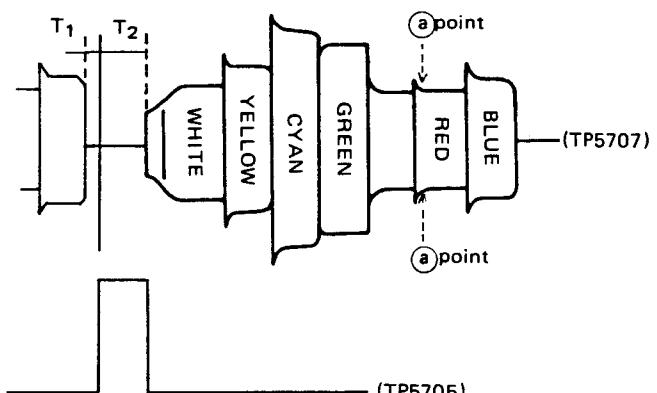


Figure 62.

#### Adjustment of SECAM colour record current (R5813)

1. Connect an oscilloscope to TP301 and TP302 (GND) of the head amplifier, and apply a SECAM colour bar signal to record it in the SP mode.
2. Set R247 (record luminance level control) at the minimum position and adjust R5813 so that the output is 20 mVp-p.
3. Return R247 to the position which gives the output of 130 mVp-p.

**Adjustment of playback equalizer (T5701)**

1. Playback a SECAM colour tape (pre-recorded) in the SP mode and connect an oscilloscope to TP5707 and TP5705.
2. Adjust T5701 so that the amplitude difference among each chroma signal becomes the least as shown in Fig. 63.

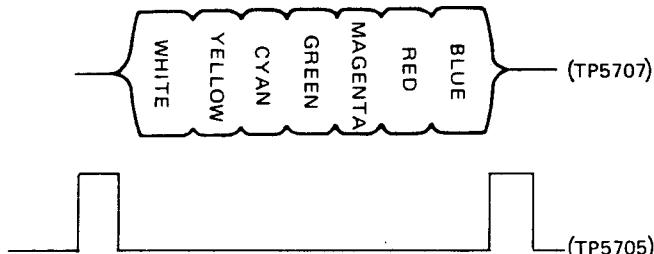


Figure 63.

**ADJUSTMENT OF TUNER/IF, AUDIO CIRCUIT****• Test point layout**

(TUNER IF/AUDIO PWB) —DUNTK1729HE—

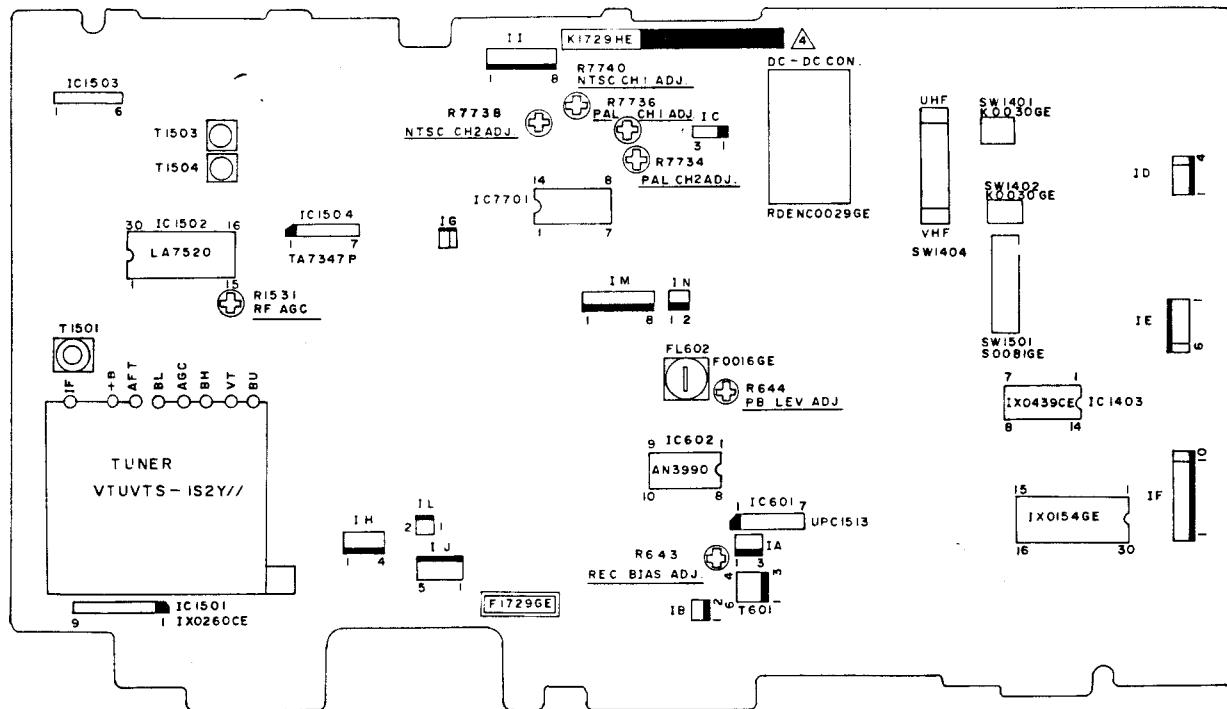


Figure 64.

**■ TUNER IF ADJUSTMENT****Caution:**

Do not perform this adjustment except when either of the tuner, detection coil (T1504) and AFT coil (T1503) is replaced with a new one.

If any one of the above parts is replaced, perform the adjustment as follows.

1. Receive PAL broadcast and turn on AFT switch.
2. Connect an oscilloscope to pin ① of IG connector, and adjust the core belonging to the replaced part so that the burst level of video signal is equal to 1/2 of the horizontal sync level. See Fig. 65.
3. Readjust R1531 (RF AGC).

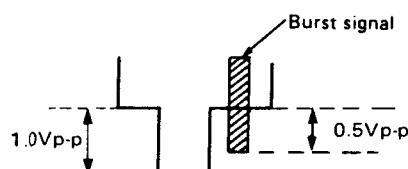


Figure 65.

**Adjustment of RF AGC**

Turn R1531 to the position where the waveform of horizontal sync signal shown in Fig. 65 begins to contract.

**■ AUDIO ADJUSTMENT****Adjustment of record bias current (R643)**

1. Connect a VTVM to both ends of R8010 (10 ohms) on the audio head PWB.
2. Adjust R643 so that the VTVM reads 2.6 mV.

**Adjustment of playback audio level (R644)**

1. Connect a VTVM to the audio output terminal and playback an alignment tape (VR<sub>o</sub>CPSV).
2. Adjust R644 so that the VTVM reads -9 dBm.

## INFORMATION ABOUT SMALL CHIP PARTS

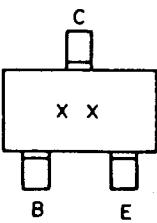
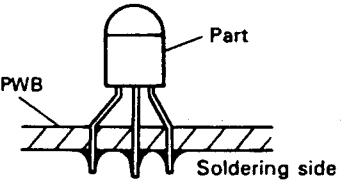
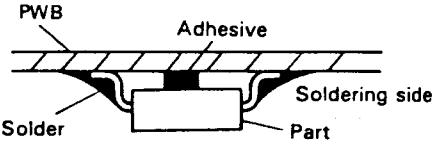
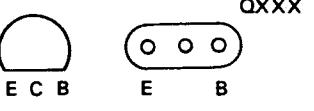
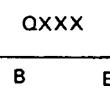
The 699 series VCR we have released this time uses those circuit boards amply equipped with small chip parts, which have so far been used only in some circuits.

In future small chip parts are expected to be used more and more; but they require no special servicing techniques, and we think they can be serviced in the same manner as ordinary parts. Hereunder are given the details of small chip parts and their servicing procedures.

### ■ DIFFERENCE OF SMALL SQUARE CHIP PARTS (or Leadless Parts) AGAINST ORDINARY PARTS

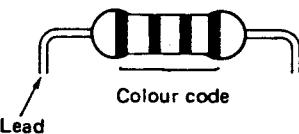
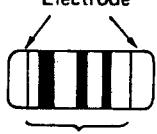
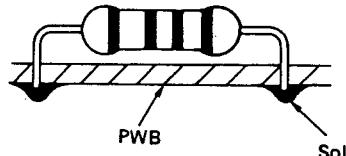
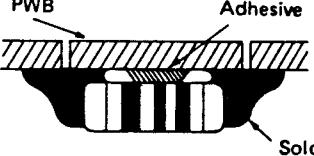
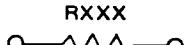
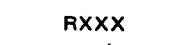
(with Leads).

- Chip Transistor

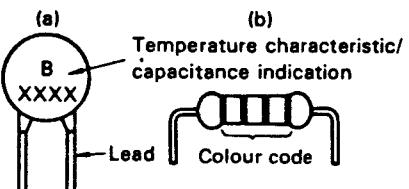
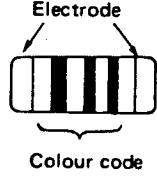
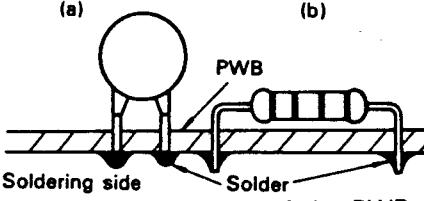
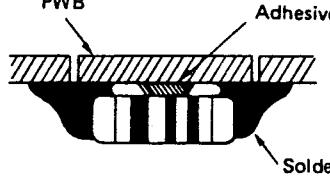
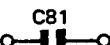
Item	Ordinary transistor	Chip transistor
Part No. (13-digit code)	VS2SAxxxxxx1E VS2SCxxxxxx1E VSDTAxxxEK/-1 VSDTCxxxEK/-1	Same as left
Appearance		
Attachment on PWB	 Affix to the front of the PWB.	 Affix to the soldering side of the PWB.
Symbol as used in the wiring diagram	Front side      Rear side  QXXX	
Symbol as used in the parts layout drawing	 QXXX	

Note: B; base electrode  
C; collector  
E; emitter

- Round Chip Resistor

Item	Ordinary resistor	Round chip resistor
Part No. (13-digit cord)	VRD-RA2BExxxJ	VRD-MN2BExxxJ
Appearance	 <p>Lead Colour code</p>	 <p>Electrode Colour code</p>
Attachment on PWB	 <p>PWB Solder</p> <p>Affix to the front of the PWB.</p>	 <p>PWB Adhesive Solder</p> <p>Affix to the wiring side of the PWB.</p>
Symbol as used in the wiring diagram		
Symbol as used in the parts layout drawing		

- Round Chip Capacitor

Item	Ordinary capacitor	Round chip capacitor
Part No. (13-digit cord)	VCKYPB1HBxxxK VCCSAT1HLxxxK VCKYAT1HBxxxK (1EX)	VCCCMN1HLxxxK _____ (H) - (J) VCKYMN1CYxxxN VCKYMN1HBxxxK
Appearance	 <p>(a) B XXXX Lead (b) Temperature characteristic/ capacitance indication Colour code</p>	 <p>Electrode Colour code</p>
Attachment on PWB	 <p>(a) PWB Soldering side Solder (b) Affix to the front of the PWB.</p>	 <p>PWB Adhesive Solder</p>
Symbol as used in the wiring diagram		
Symbol as used in the parts layout drawing		Same as for the round chip resistor

## ■ METHOD OF MARKING CHIP PARTS

The method of marking chip parts is not yet unified among manufacturers, so it is different from manufacturer to manufacturer.

At present each manufacturer uses the following marking method for principal parts, however.

### IDENTIFICATION OF CHIP PARTS

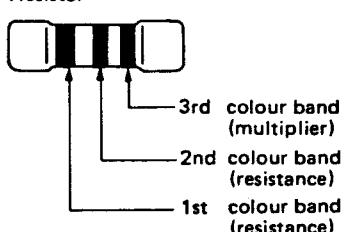
- Transistors

Designation	Parts Code	Designation	Parts Code
L 5	VS2SC1623L51E	Q0	VS2SC2714-01E
M 5	VS2SA812-M51E	26	VSDTC144K/-1
N E	VS2SD1306-E1E	15	VSDTA124EK/-1

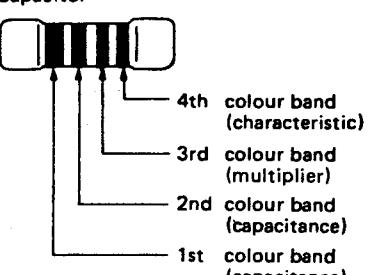
- Resistors and Capacitors

colour band Colour	1st colour band	2nd colour band	3rd colour band		4th colour band (for capacitor only)
			Resistor	Capacitor	
Black	0	0	$10^0$ (X 1 ohm)	$10^0$ (X 1PF)	○(CH)
Brown	1	1	$10^1$ (X 10 ohm)	$10^1$ (X 10PF)	—
Red	2	2	$10^2$ (X 100 ohm)	$10^2$ (X 100PF)	—
Orange	3	3	$10^3$ (X 1K ohm)	$10^3$ (X 1000PF)	—
Yellow	4	4	$10^4$ (X 10K ohm)	$10^4$ (X 10000PF)	○(RH)
Green	5	5	$10^5$ (X 100K ohm)	—	—
Blue	6	6	$10^6$ (X 1M ohm)	—	—
Violet	7	7	$10^7$ (X 10M ohm)	—	○(UJ)
Gray	8	8	$10^8$ (X 100M ohm)	—	—
White	9	9	$10^9$ (X 1000M ohm)	—	—
Gold	—	—	$10^{-1}$ (X 0.1 ohm)	$10^{-1}$ (X 0.1PF)	—
Silver	—	—	—	$10^{-2}$ (X 0.01PF)	—

Resistor



Capacitor



Note 1: If a capacitor has no 4th colour band indication on it, its characteristic is of usual specification.

Note 2: If a resistor has not any colour band indication on it, this can be used as a jumper.

## ■ SERVICING OF SMALL CHIP PARTS

### Removal of square-shaped chip.

1. Using a soldering iron, heat the solder at each terminal of the chip to get it absorbed into a braided wire applied thereon. See Fig. 66.
2. Holding the chip with a pincette, take it off gently using the soldering iron's heat applied on each terminal of it. See Fig. 67.

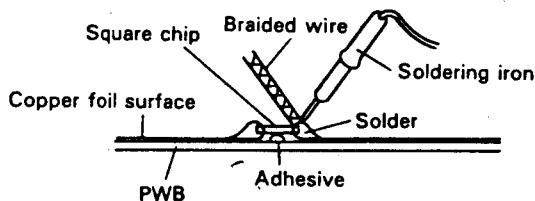


Figure 66.

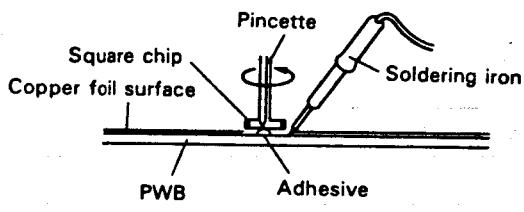


Figure 67.

### Caution on removal:

1. When handling the soldering iron, use suitable pressure and be careful.
2. When removing the chip, do not use undue force with the pincette.
3. The soldering iron in use should be a 30W one: it is best if provided with a thermal control (about 280°C).
4. The chip once removed must not be used again.

### Attachment of square shaped chip

1. Temporarily solder one terminal of the chip on the copper foil surface. See Fig. 68.
2. Holding one end of the chip with a pincette, completely solder both terminals of it, one after the other. See Fig. 69.

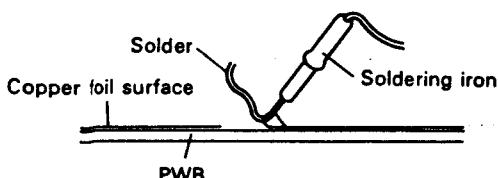


Figure 68.

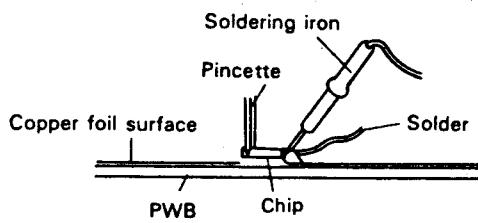
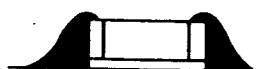


Figure 69.

### Cautions on attachment:

1. When soldering the chip terminals, do not touch them directly with the soldering iron. The soldering must be as quick as possible being careful not to hurt the terminals and the body itself.
2. When touching the square chip with a pincette, hold its terminal but never its body.
3. Keep the chip's body in contact with the PWB when soldering.
4. The soldering iron in use should be a 30W one: it is best if provided with a thermal control (about 280°C).
5. The soldering should not be made outside the specified area.
6. Soldering flux (of rosin) may be used but shall not be acid.
7. After soldering, let the chip cool down gradually at room temperature.
8. The soldering amount should be proper: with an excessive amount the chip may be cracked and subject to other troubles (curvature of PWB, cramp of terminals, etc.). See Fig. 70.

Incorrect soldering



Correct soldering

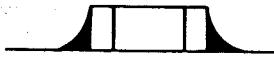


Figure 70.

### General cautions on handling and storage

1. Oxidization on the chip's terminals results in poor soldering. Do not handle them with bare hands.
2. For storage, avoid the following places where oxidation will occur, and their capacitance and resistance will deteriorate.
  - a) In areas with sulfur or chlorine gas
  - b) Directly sunlit places
  - c) High temperature/high humidity places

## GLOSSARY

	Abbreviation	•		Abbreviation	
A	ABSS	Auto Blank Section Scan		J	J.K.F-F
	AFC	Automatic Frequency Control		K	KE
	AFT	Automatic Fine Tuning		L	LED
	AGC	Automatic Gain Control			LDM
	ALC	Automatic Level Control			LPF
	APC	Automatic Phase Control			LP
	AD	Analog-Digital Converter		M	MIC
	AL	After Loading			MM
	ACL	All Clear		N	NC
	AT	All Time			NS (N/S)
AV (A/V)	Audio/Video			O	OSC
	A-Mute	Audio Mute		P	PAD
C	CAP	Capstan			PAM
	CAP.M.	Capstan Motor			PCM
	C.FG	Capstan Frequency Generator			PDM (PWM)
	C.PG	Capstan Pulse Generator			PFM
	CST	Cassette			PPM
	CST.M.	Cassette Motor			PB
	CSA	Cassette Switch-A			PG
	CSB	Cassette Switch-B			PR
	CSD	Cassette Swtich-D			PU
	CH	Channel			PWB
D	CTL	Control		R	REC
	D.D.	Direct Drive			REM (R/C)
	D.F.F.	D-Flip-Flop			REV
	DM	Drum Motor			REW
	D.FG	Drum Frequency Generator			RF
	D.PG	Drum Pulse Generator			
	D.TPG	Drum Trapezoidal Generator			
	DET	Detector			
	DUB	Dubbing			
E	EE	Electric to Electric		S	S/H
	EF	Emitter Follower			SN
	EP	Extended Play			SP
	ES	End Sensor			SS
F	F-ADV-P	Frame Advance Pulse			SSVM
	FWD	Forward			STILL-H
	F/R	Forward/Reverse			SUP-REEL
	FF	Fast Forward			SW
	FM	Frequency Modulation		T	TPG
	F.G.	Frequency Generator			TU-REEL
	F.E.	Full Erase			
	FV	False Vertical Sync.		U	UL
H	Hi-Fi	High Fidelity			UR
	HPA	High Pass Amplifier			
	HPF	High Pass Filter			
	HS (H/S)	Half Speed			
	HSP	Head Switching Pulse		V	VCO
	H. SYNC	Horizontal Sync.			VCR
I	ID	Identical Amplifier			V-MUTE
	IF	Intermediate Frequency			V-LOCK
					VS (PS)
					VSF
					VSR
					VTVM

## SCHEMATIC DIAGRAM

**IMPORTANT SAFETY NOTICE:**  
BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET.  
PARTS MARKED WITH "⚠" AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.  
BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

### SAFETY NOTES:

1. DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.
2. SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.

### NOTES:

1. The unit of resistance "ohm" is omitted ( $k = 1000$  ohm,  $M = 1$  Meg ohm).
2. All resistors are 1/8 watt, unless otherwise noted.
3. The unit of capacitance "F" is omitted ( $\mu = \mu F$ ,  $p = \mu\mu F$ ).

### VOLTAGE MEASUREMENT CONDITIONS:

1. DC voltages are measured between points indicated and chassis ground by VTVM, with AC110/127/220/240 AUTO, 50/60Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.
2. Voltages are measured with  $10000\mu V$  B & W or colour signal.

### WAVEFORM MEASUREMENT CONDITIONS:

$10000\mu V$  87.5 percent modulated colour bar signal is fed into tuner:

### CAUTION:

This circuit diagram is original one. Therefore there may be a slight difference from yours.

## OVERALL SCHEMATIC DIAGRAM

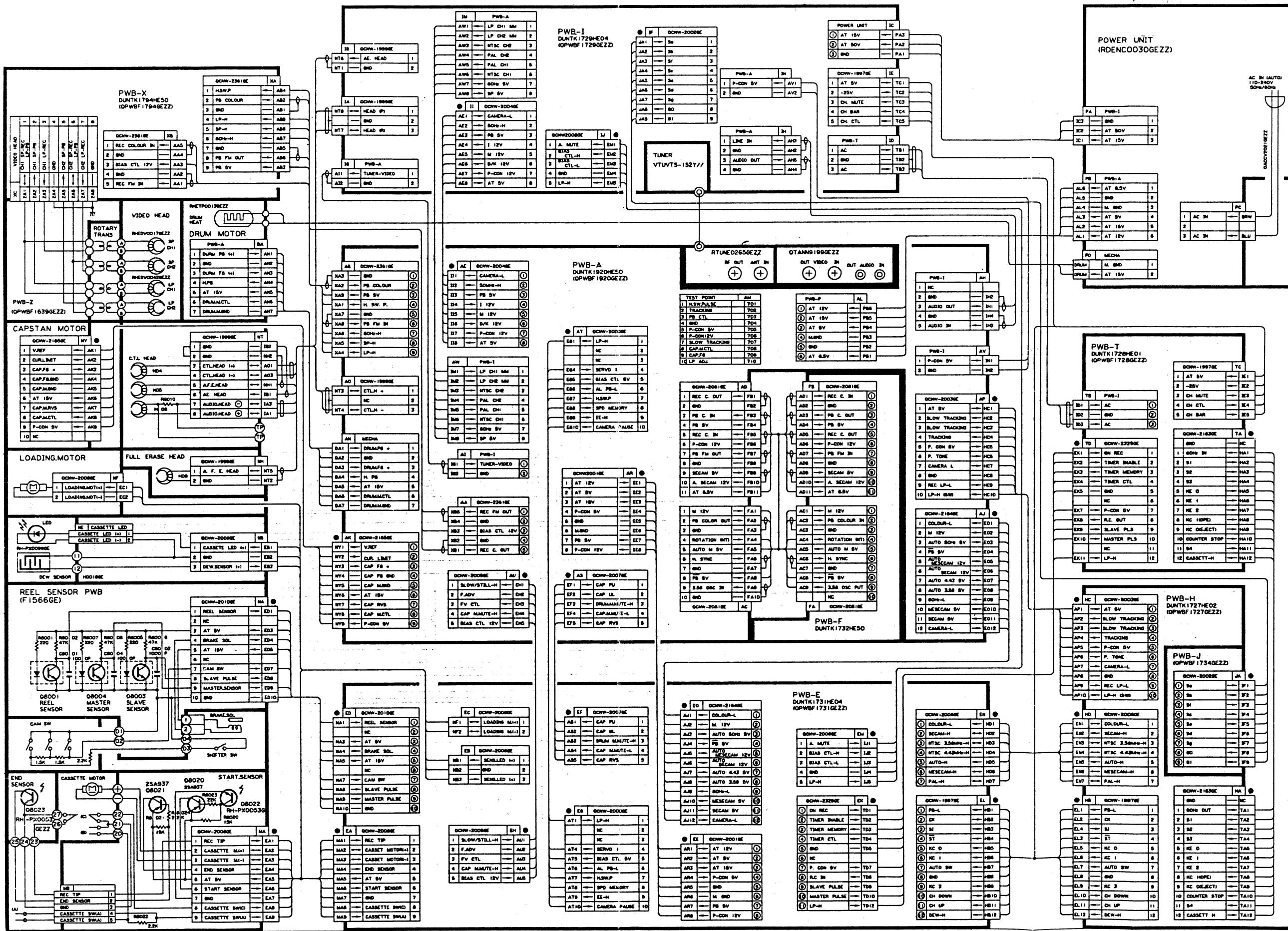


Figure 71.

## PWB-A, SERVO CIRCUIT SCHEMATIC DIAGRAM

NOTE: For wiring side PWB, refer to Figures 84 and 85. (see pages 67 ~ 70)

## -Servo signals-

- Capstan automatic frequency control signal
- Capstan automatic phase control signal
- - - Drum automatic frequency control signal
- - - Drum automatic phase control signal

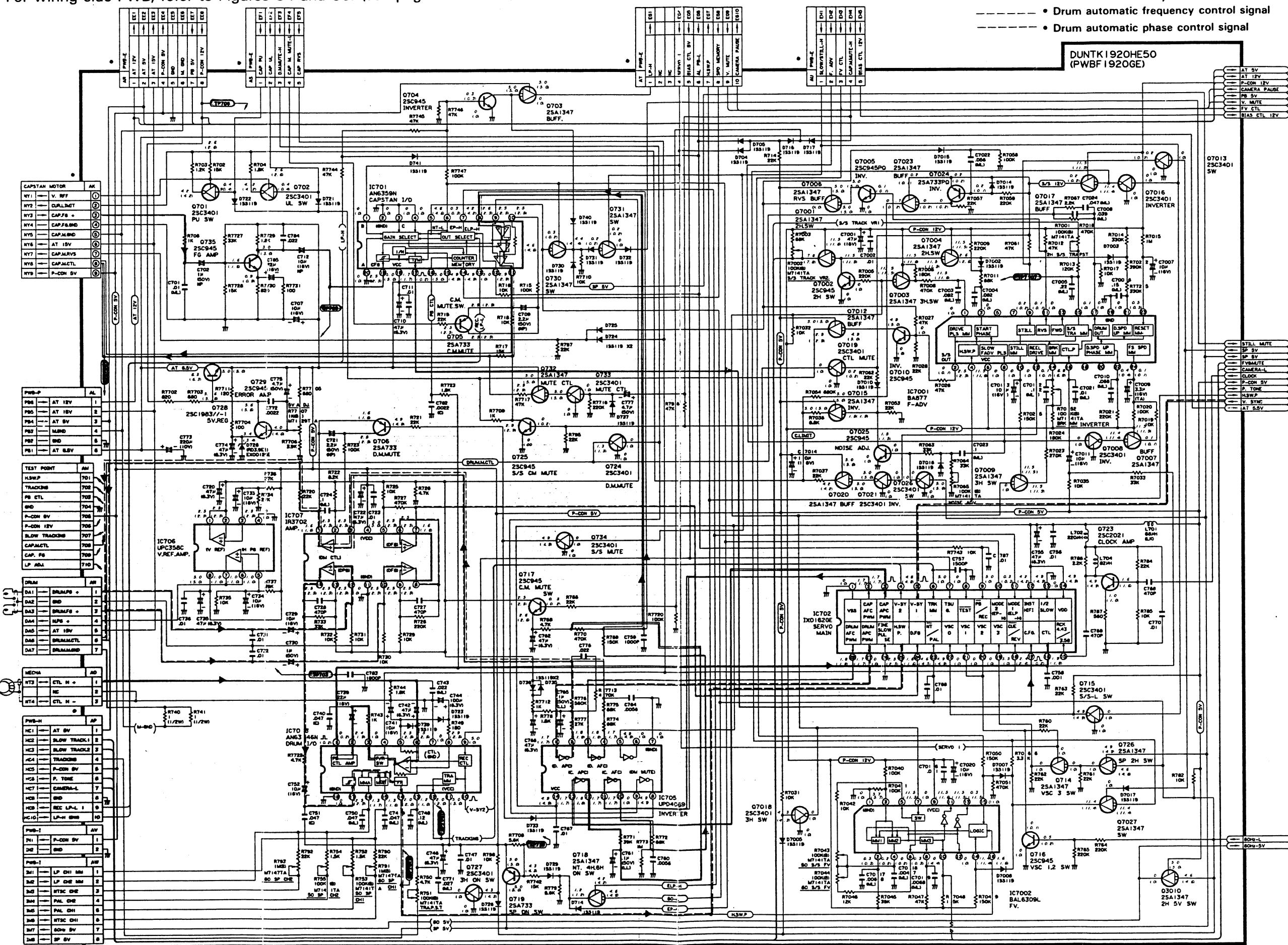


Figure 72.

**PWB-A, Y/C CIRCUIT SCHEMATIC DIAGRAM**

NOTE: For wiring side PWB, refer to Figures 84 and 85. (see pages 67 ~ 70)

-Y/C signals-

- Playback luminance signal
- Record luminance signal
- Record chrominance signal

- Playback chrominance signal
- E-E signal  
(luminance and chrominance)

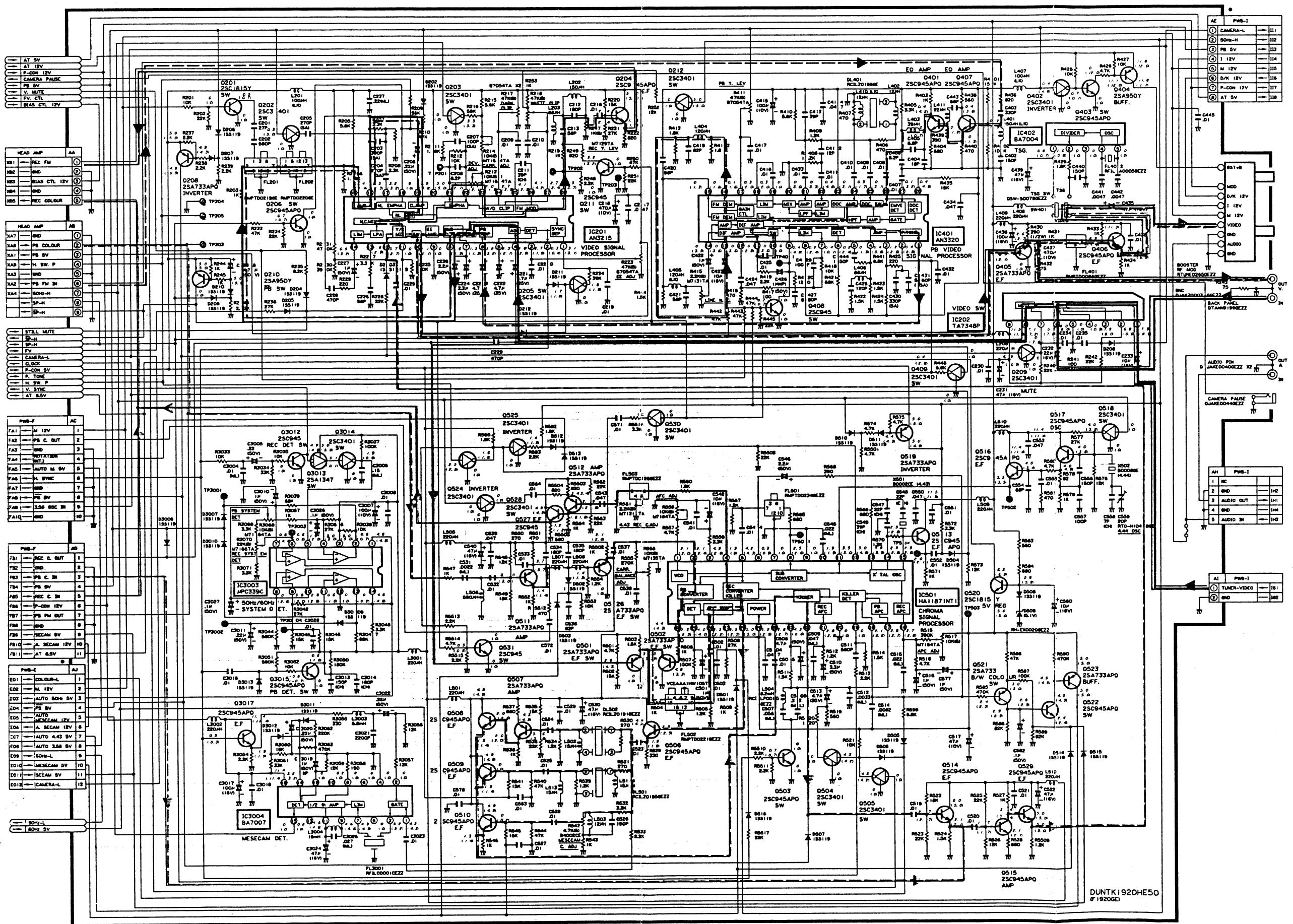
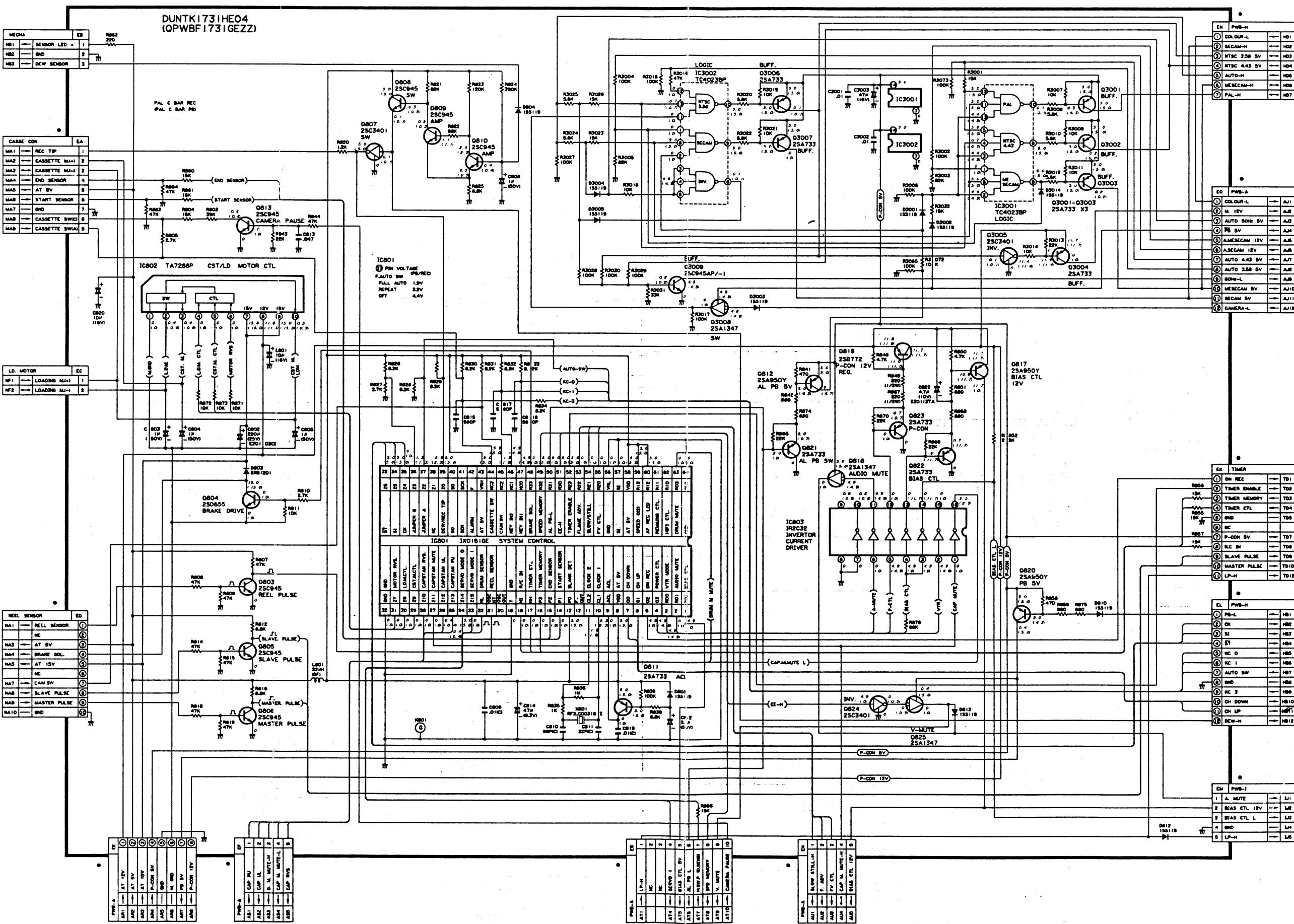


Figure 73.

PWB-E, SYSTEM CONTROLLER CIRCUIT SCHEMATIC DIAGRAM

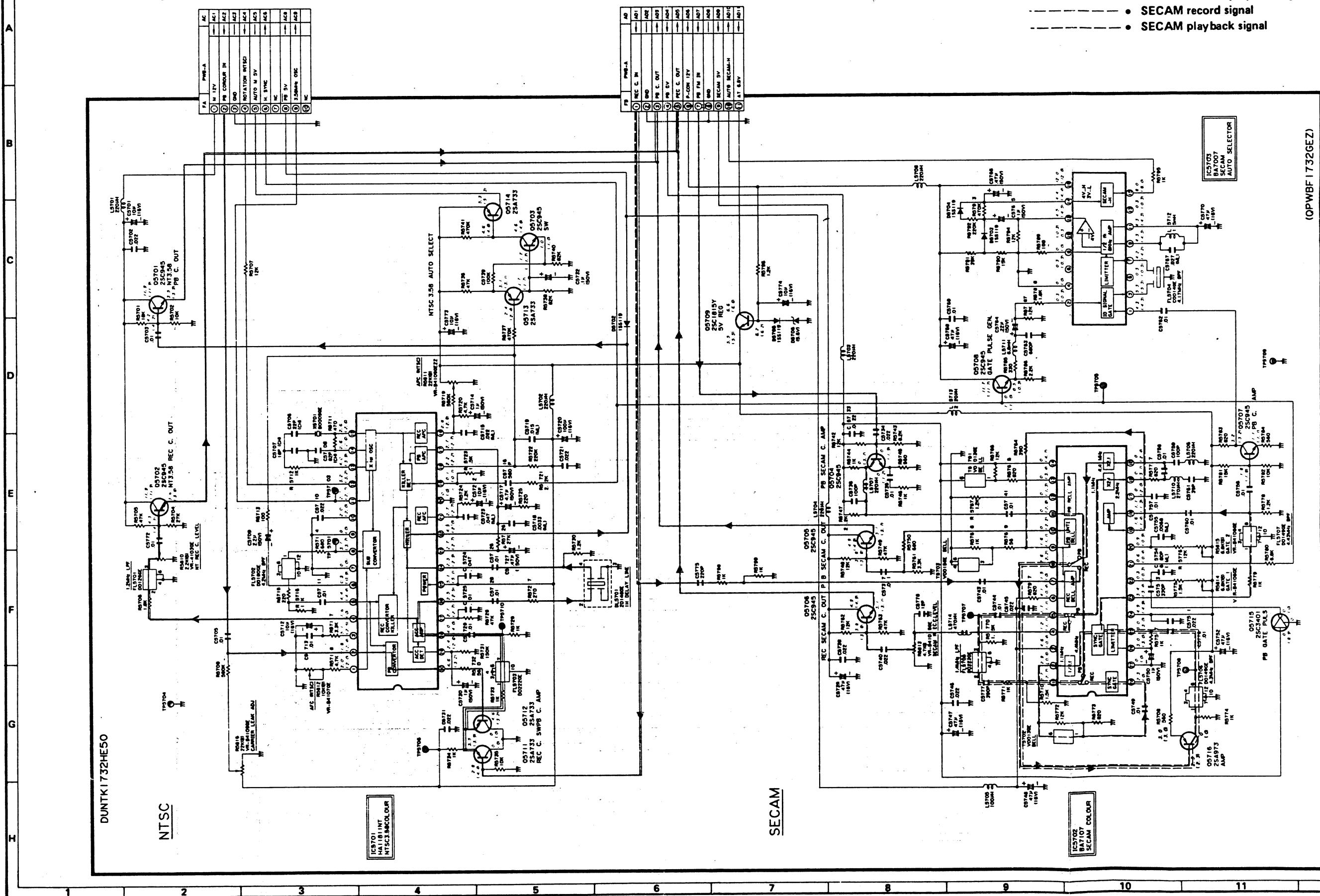
**NOTE:** For wiring side PWB, refer to Figure 86. (see pages 71 ~ 72)



**Figure 74.**

## PWB-F, CHROMA (NTSC/SECAM) CIRCUIT SCHEMATIC DIAGRAM

NOTE: For wiring side PWB, refer to Figure 87. (see pages 73 ~ 74)



**Figure 75.**

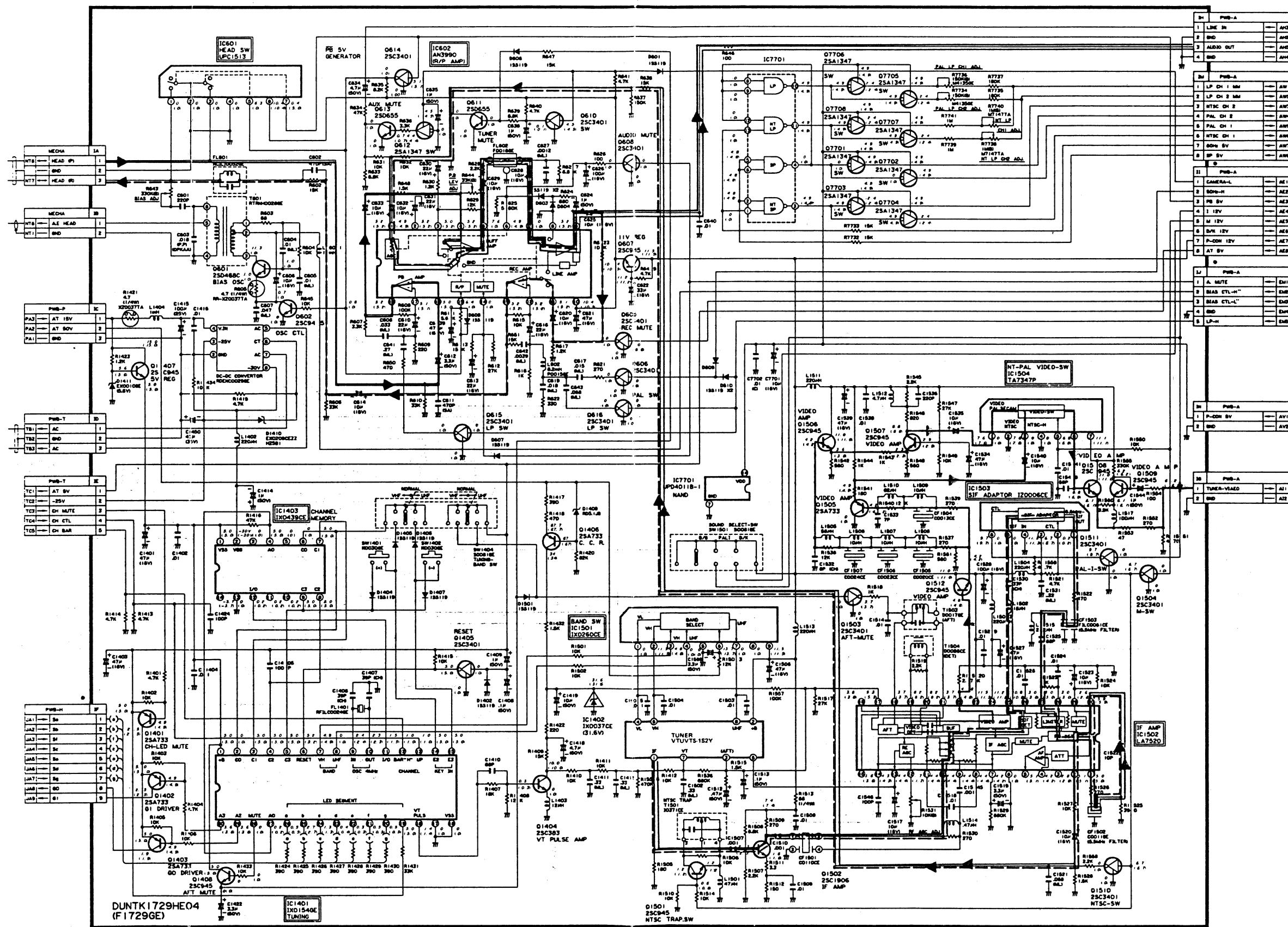
PWB-I, TUNER IF / AUDIO CIRCUIT SCHEMATIC DIAGRAM

**NOTE:** For wiring side PWB, refer to Figure 89. (see pages 75 ~ 76)

#### -Tuner IF/Audio signals

- — — — • **Audio record signal**
- — — — • **Audio playback signal**

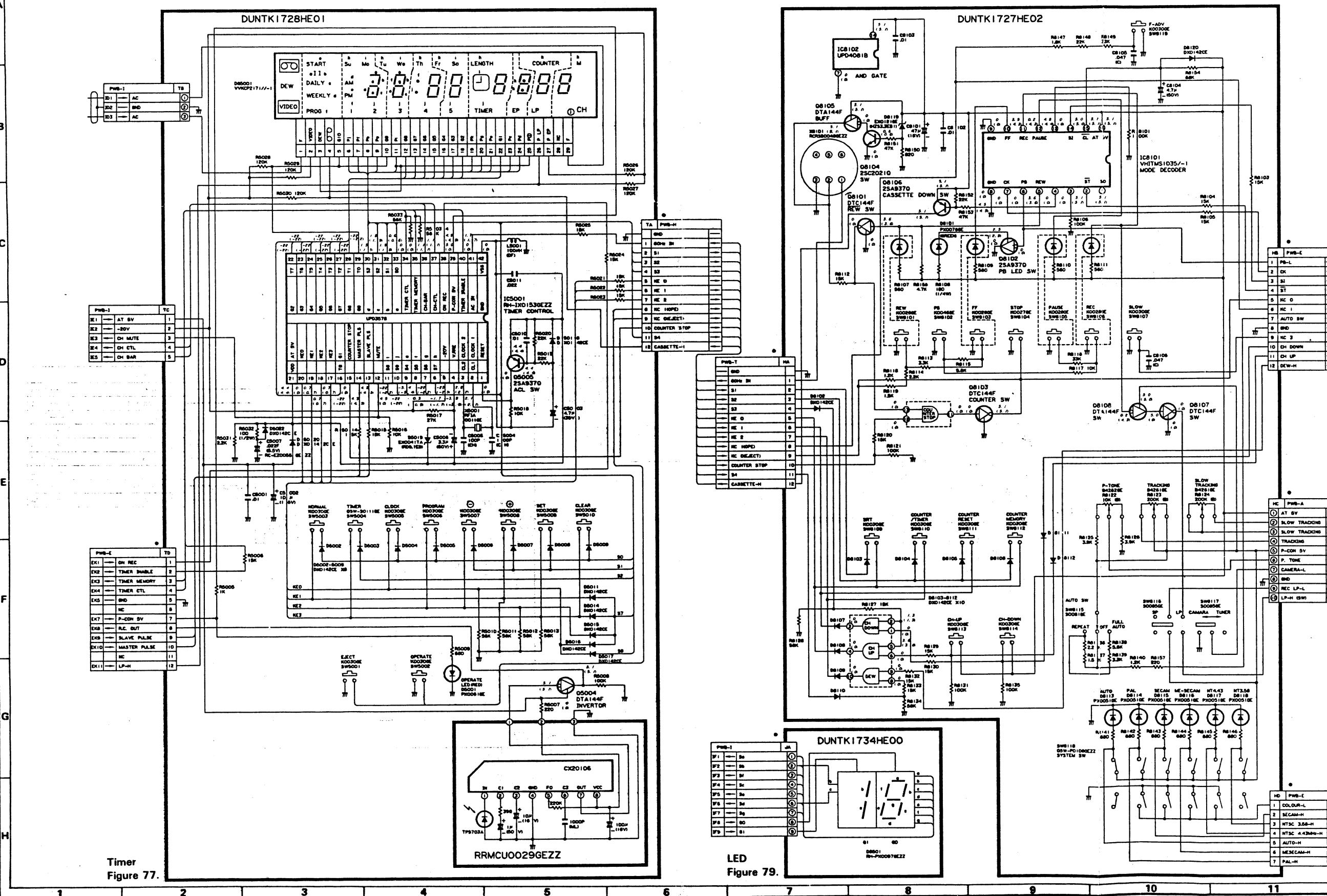
- • Audio E-E signal
- • Tuner video signal



**Figure 76.**

**PWB-H, OPERATION CIRCUIT SCHEMATIC DIAGRAM**

NOTE: For wiring side PWB, refer to Figure 88.  
(see pages 73 ~ 74)

Operation  
Figure 78.Timer  
Figure 77.

PWB-X, HEAD AMP CIRCUIT SCHEMATIC DIAGRAM

**NOTE:** For wiring side PWB, refer to Figure 92. (see pages 77 ~ 78)

-Head amp. signals (luminance and chrominance)

- • Record luminance signal
  - • Record chrominance signal
  - - - - • Playback luminance signal
  - - - - • Playback chrominance signal

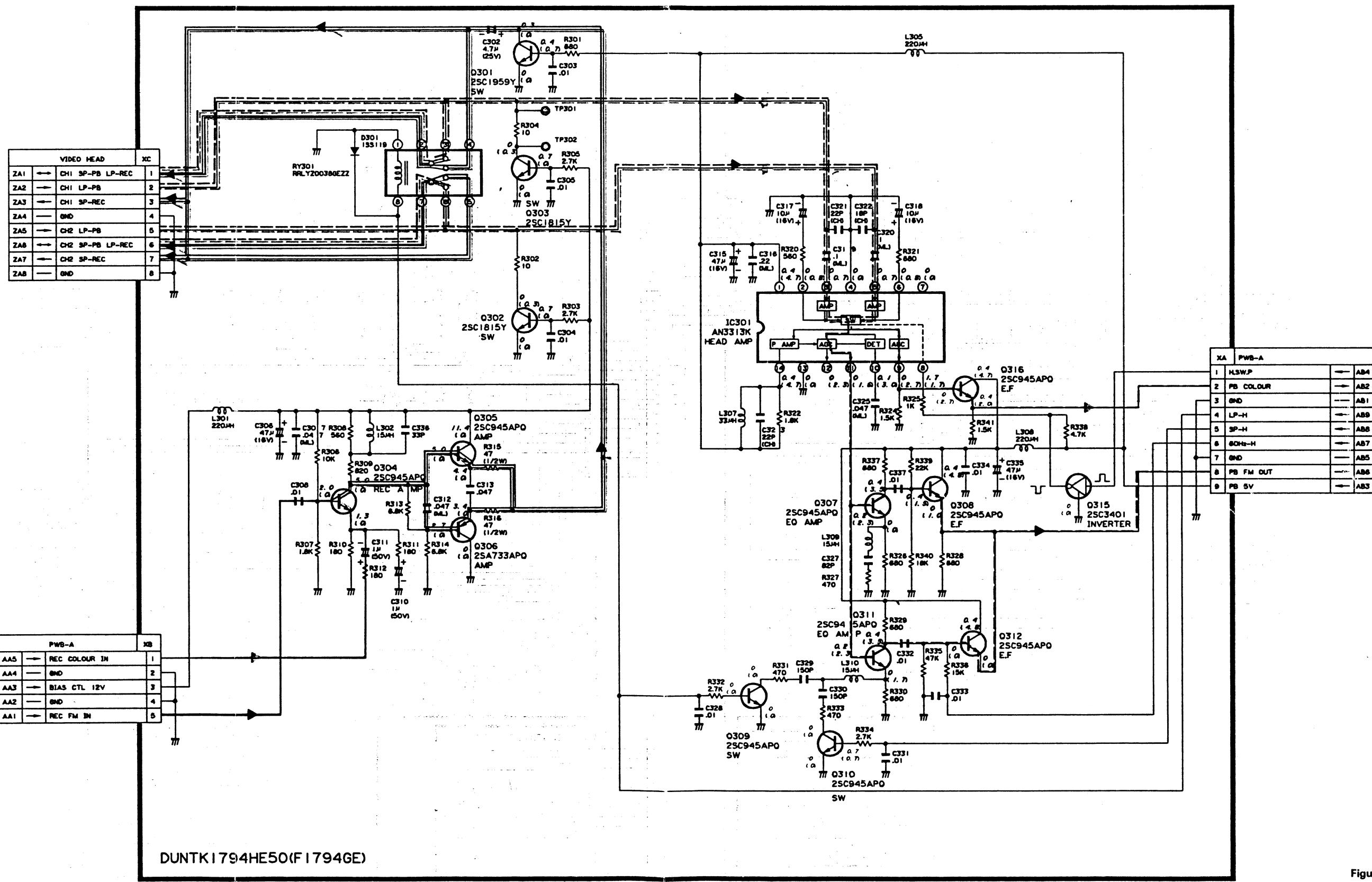


Figure 80.

**PWB-P, POWER CIRCUIT SCHEMATIC DIAGRAM**

NOTE: For wiring side PWB, refer to Figure 93. (see page 79)

A

B

C

D

E

F

G

H

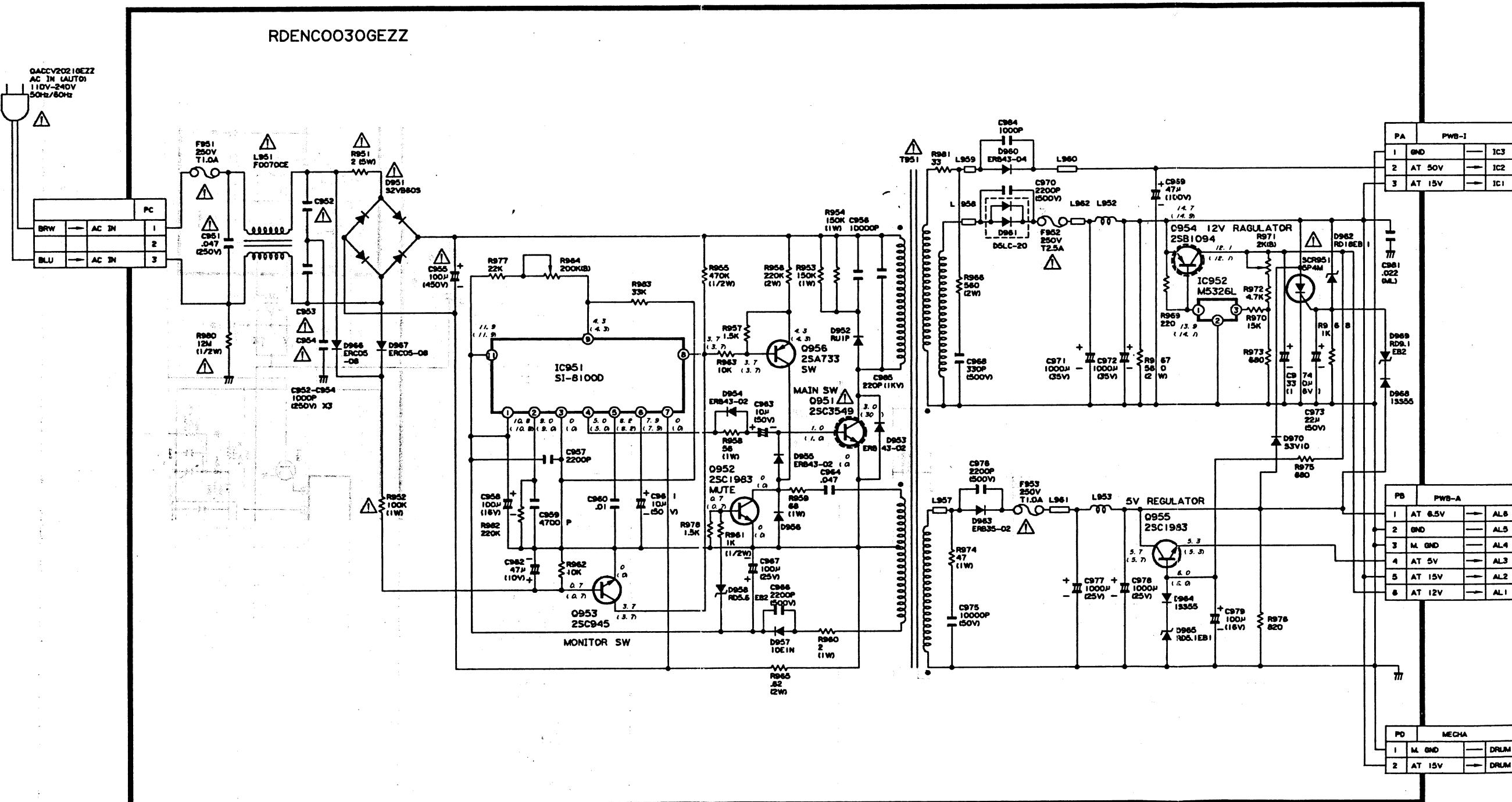
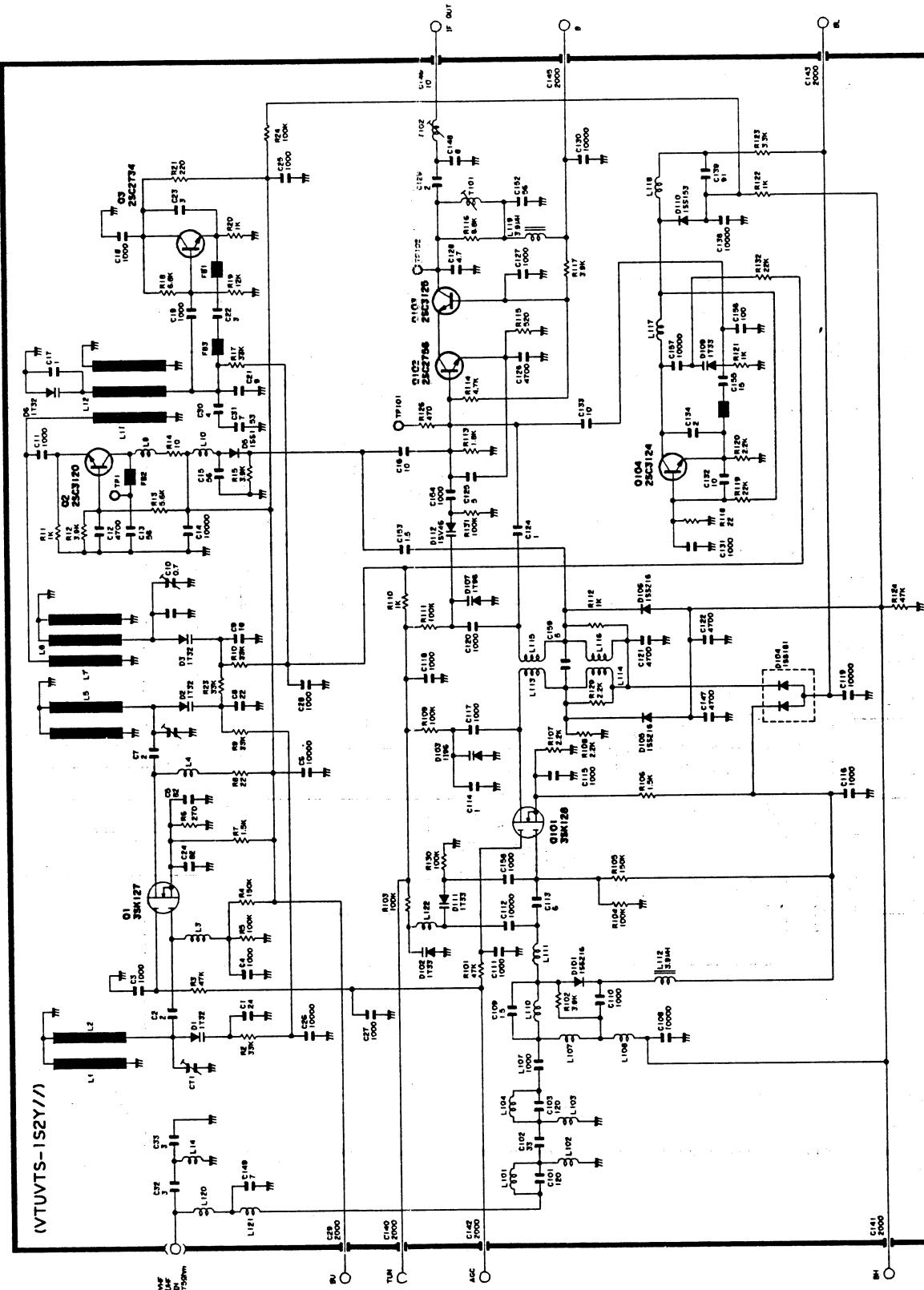


Figure 81.

## **TUNER SCHEMATIC DIAGRAM**



**Figure 82**

## RF CONVERTER SCHEMATIC DIAGRAM

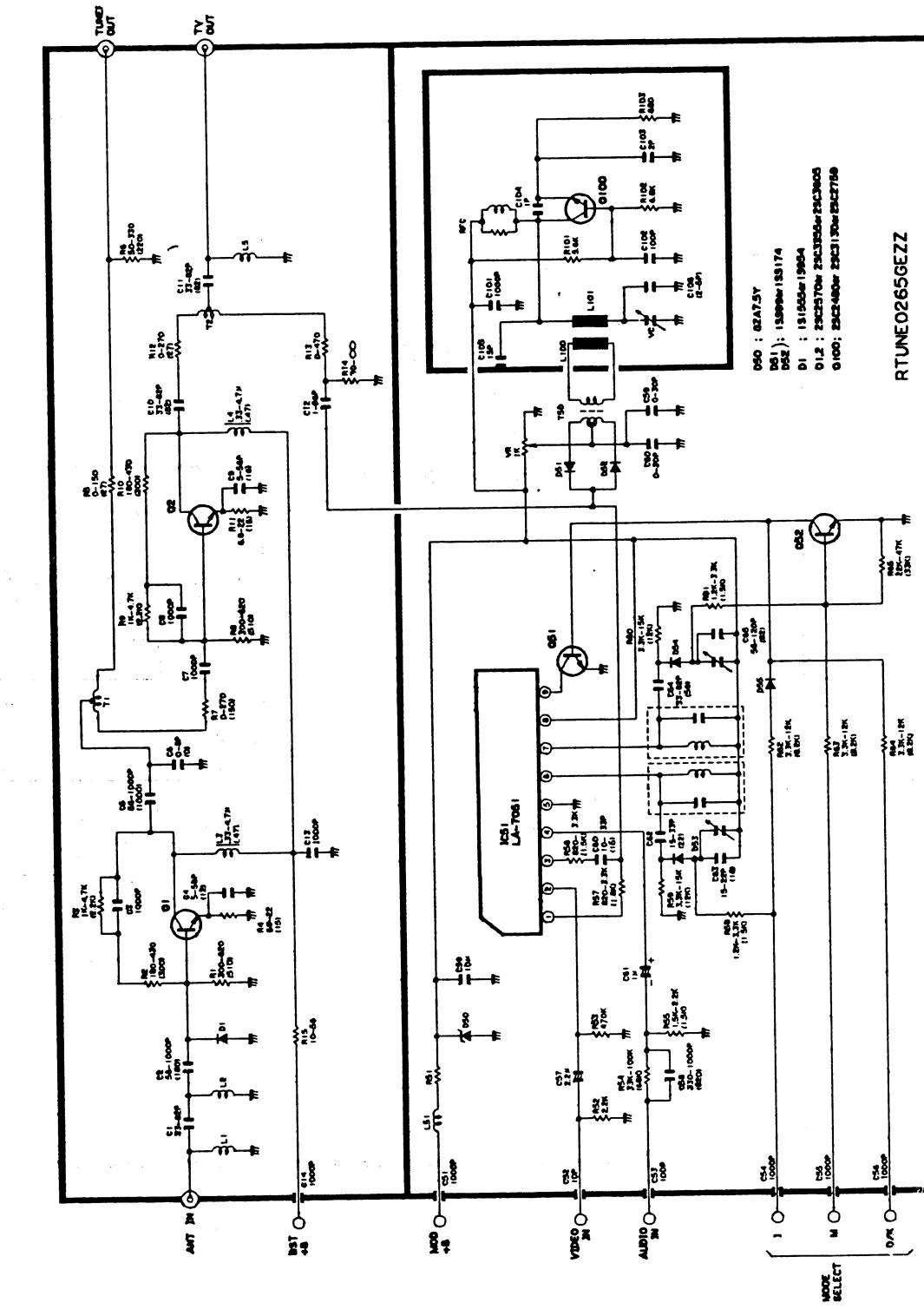


Figure 83.

## PWB-A, SERVO, Y/C CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figures 72 and 73. (see pages 49 ~ 52)

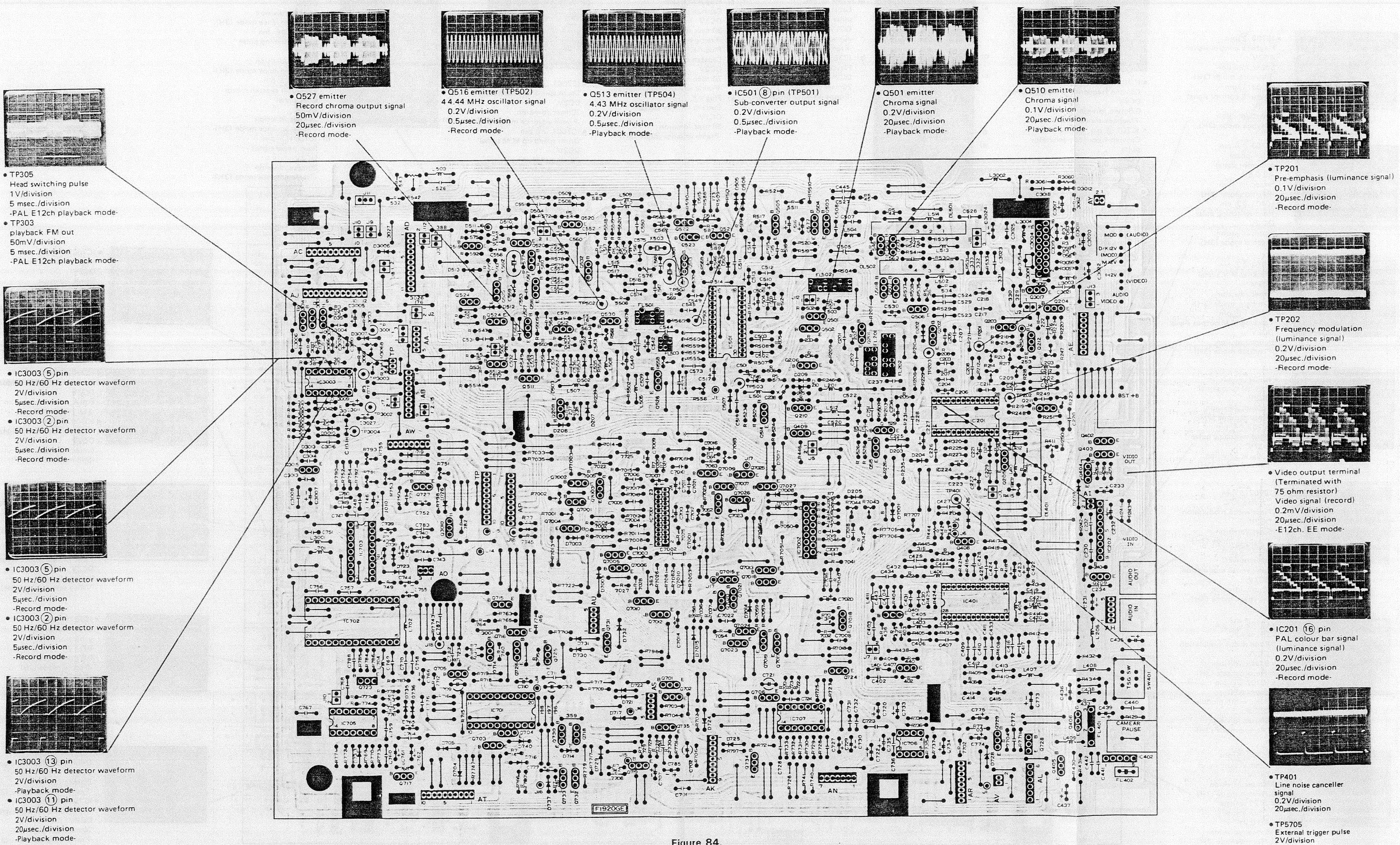
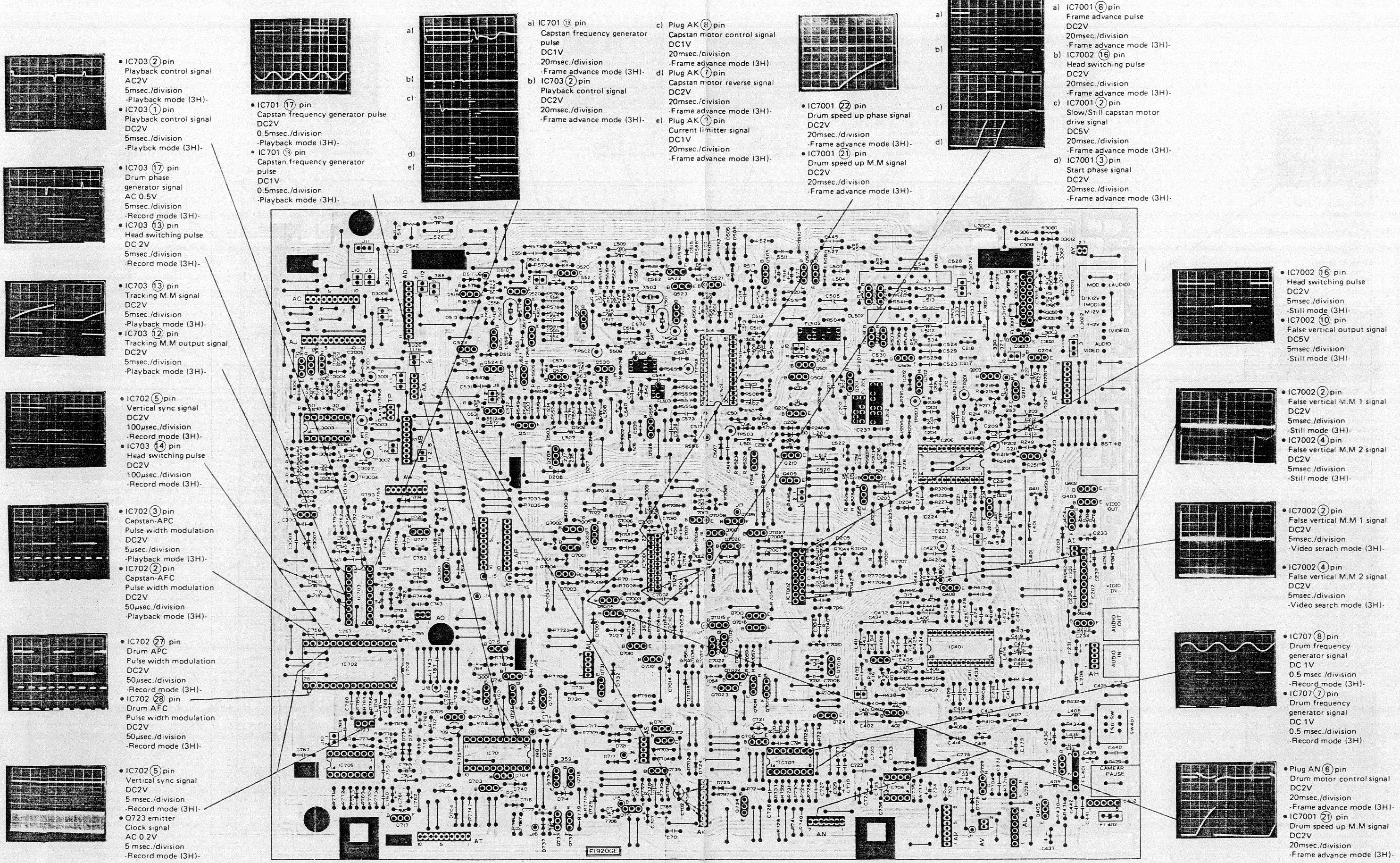


Figure 84.

## PWB-A, SERVO, Y/C CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figures 72 and 73. (see pages 49 ~ 52)



PWB-E, SYSTEM CONTROLLER CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 74. (see pages 53 ~ 54)

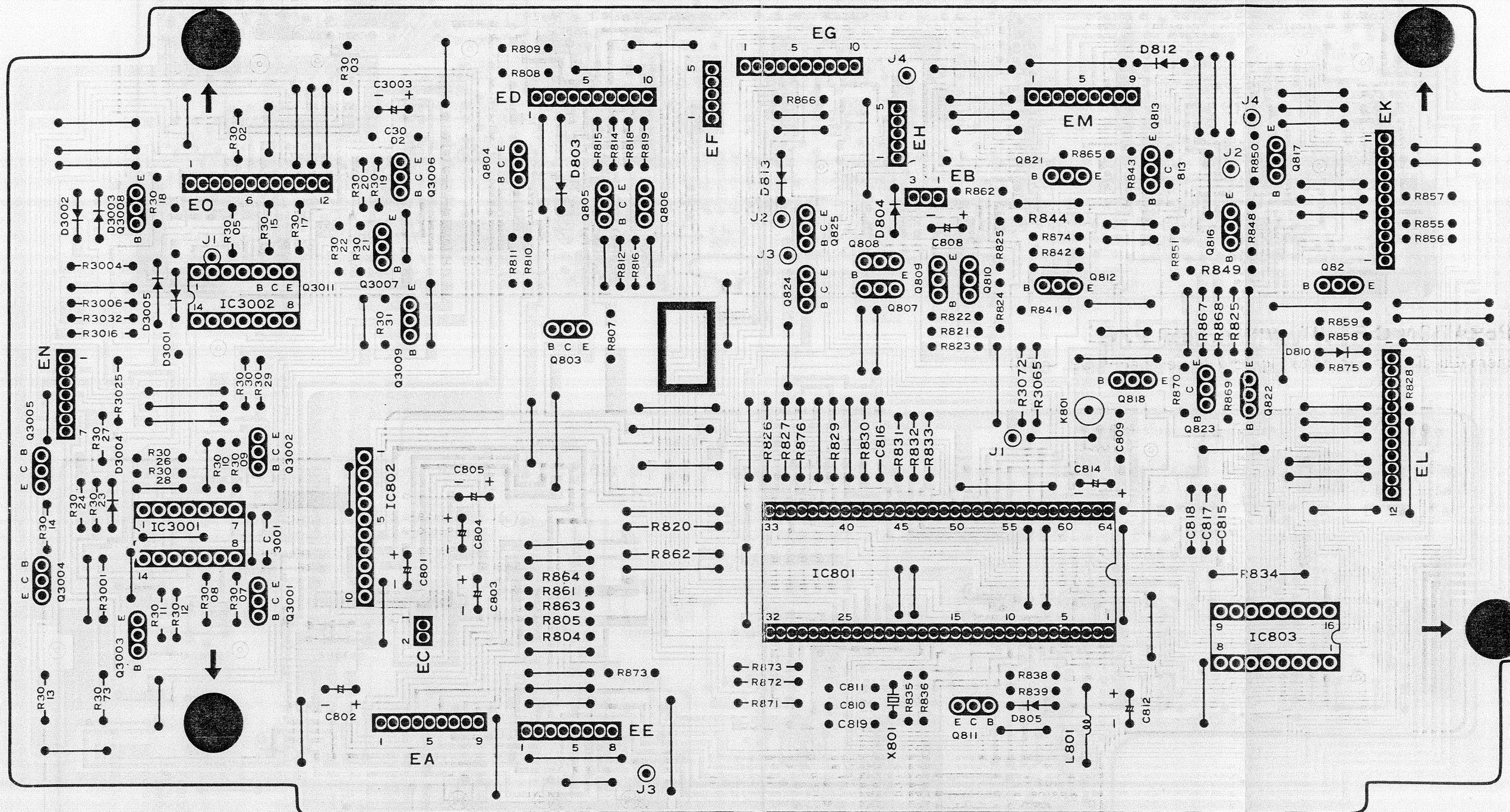


Figure 86.

## PWB-F, CHROMA (NTSC/SECAM) CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 75. (see pages 55 ~ 56)

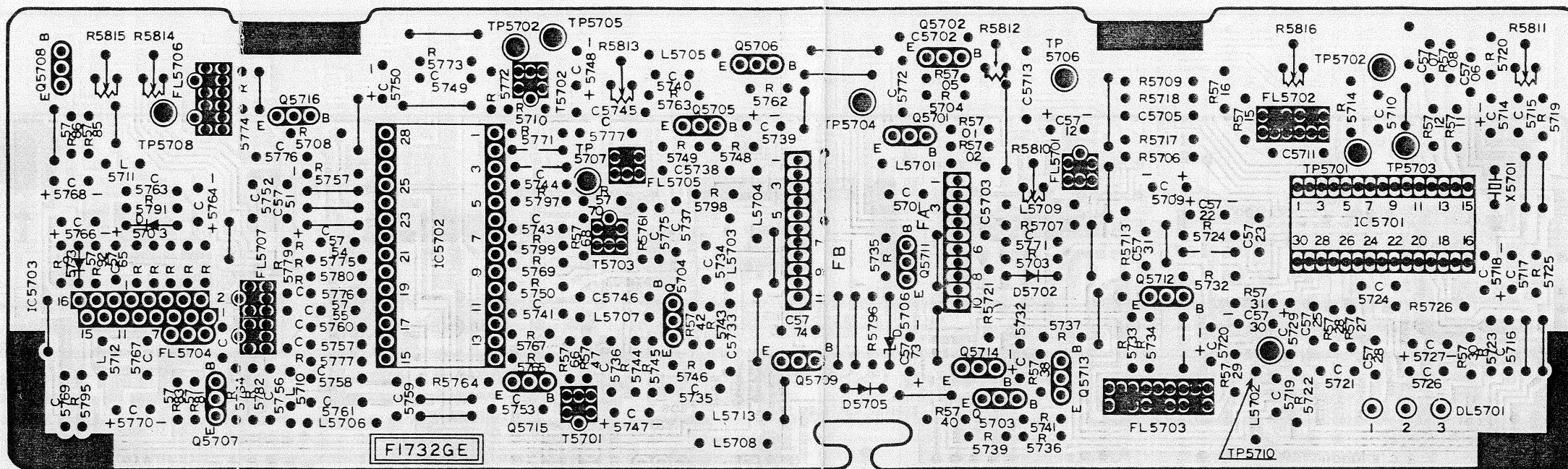


Figure 87.

## PWB-H, OPERATION CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 78. (see pages 59 ~ 60)

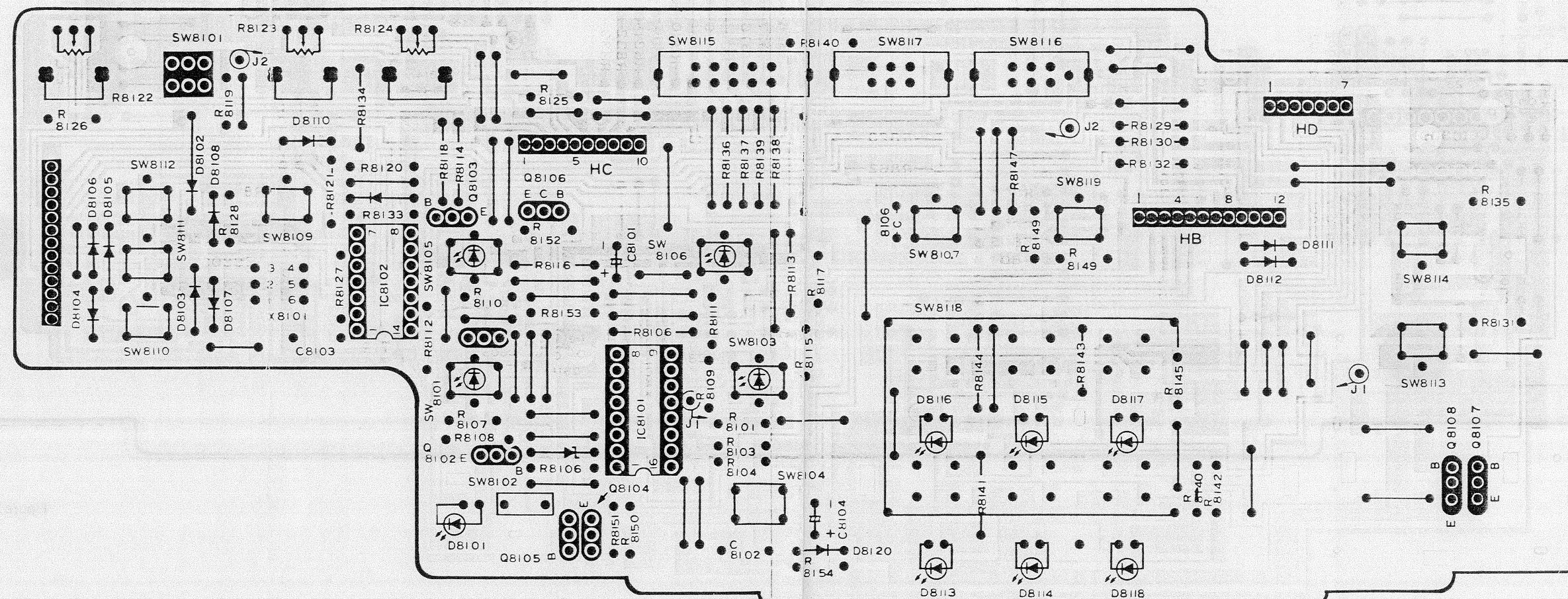


Figure 88.

PWB-I, TUNER IF / AUDIO CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 76. (see pages 57 ~ 58)

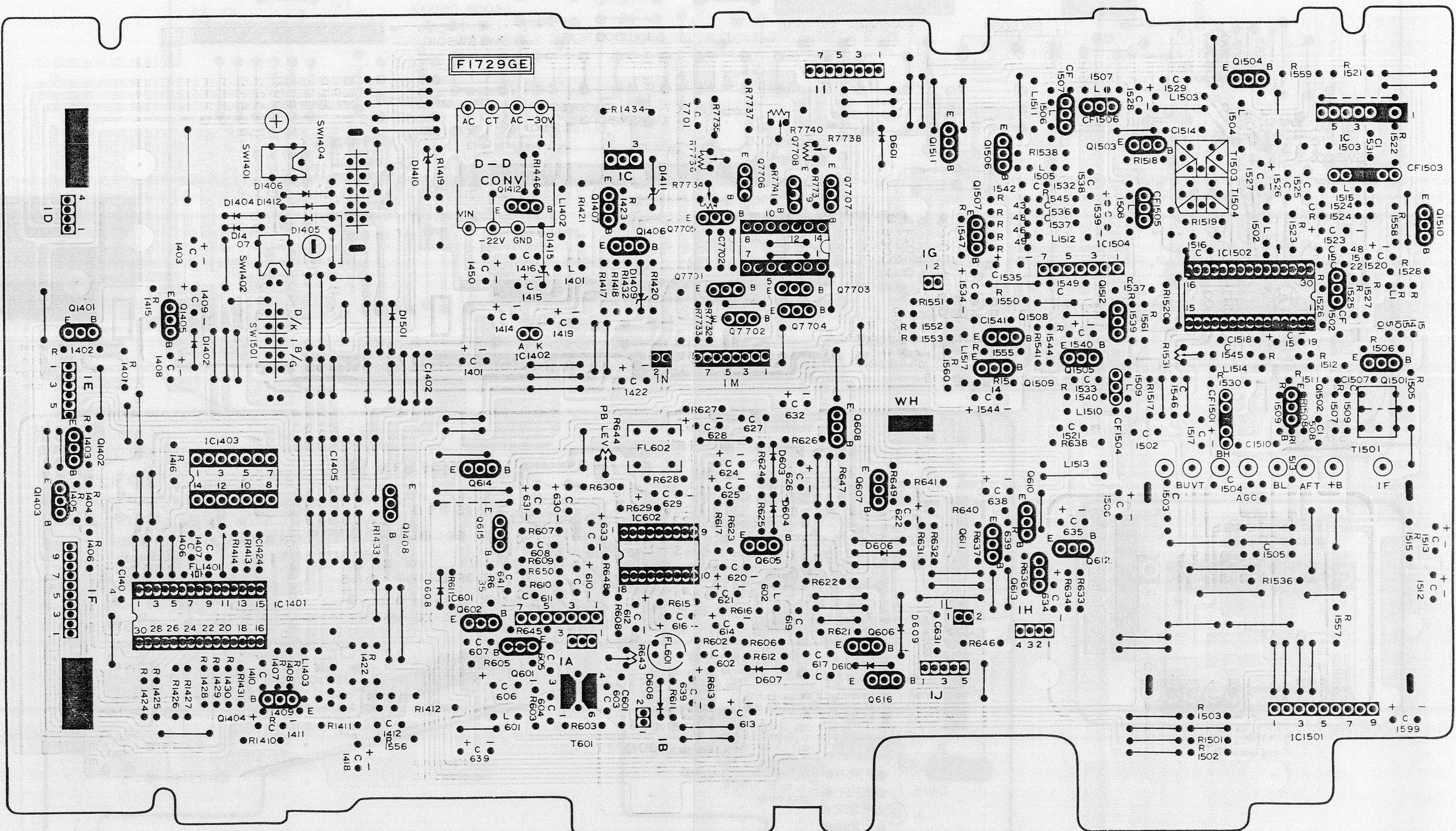
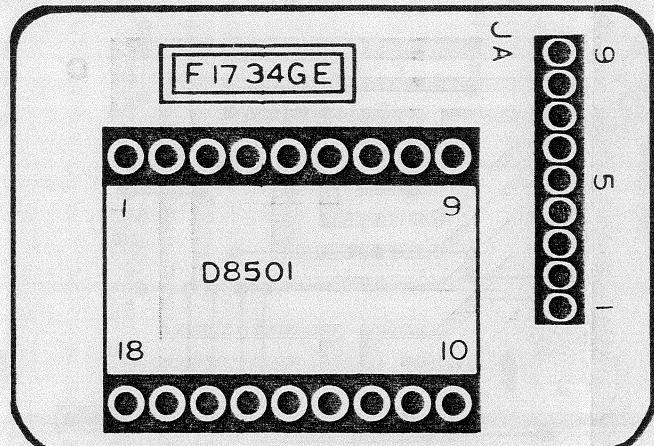
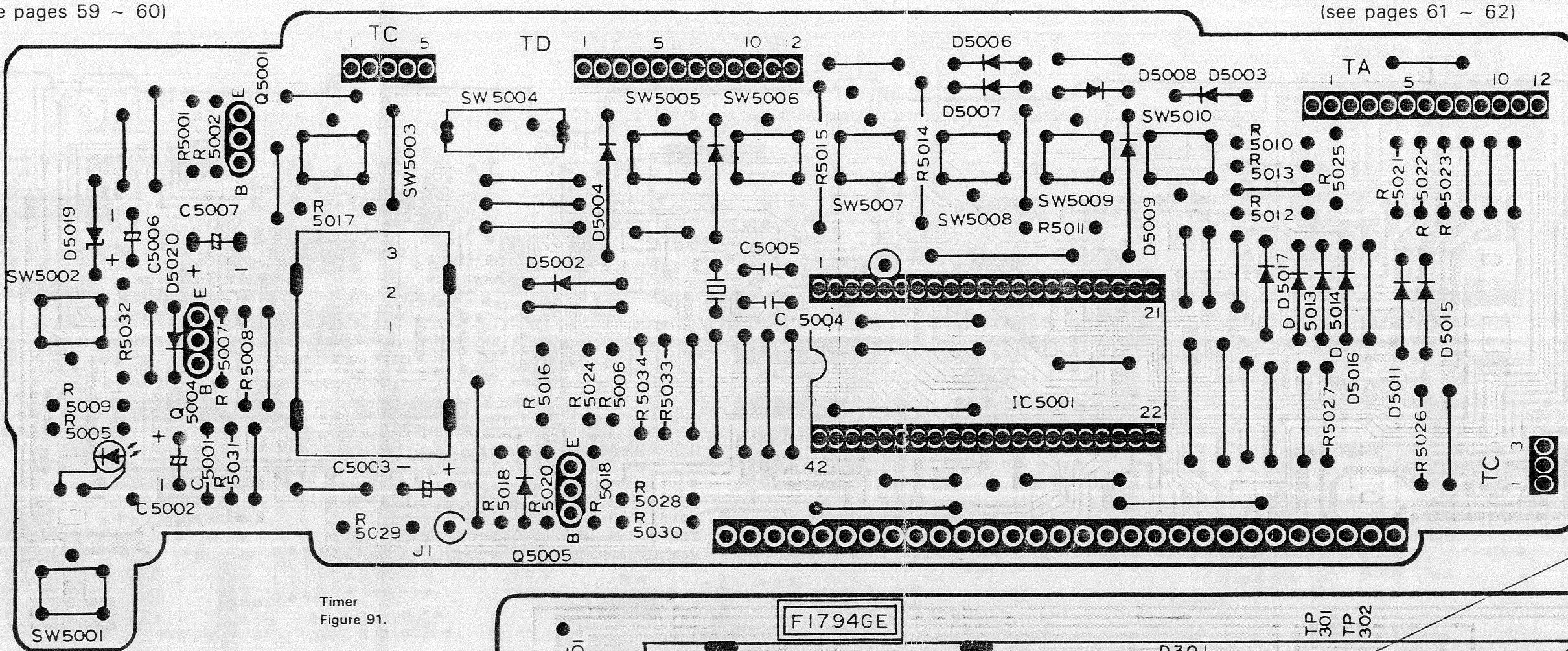


Figure 89

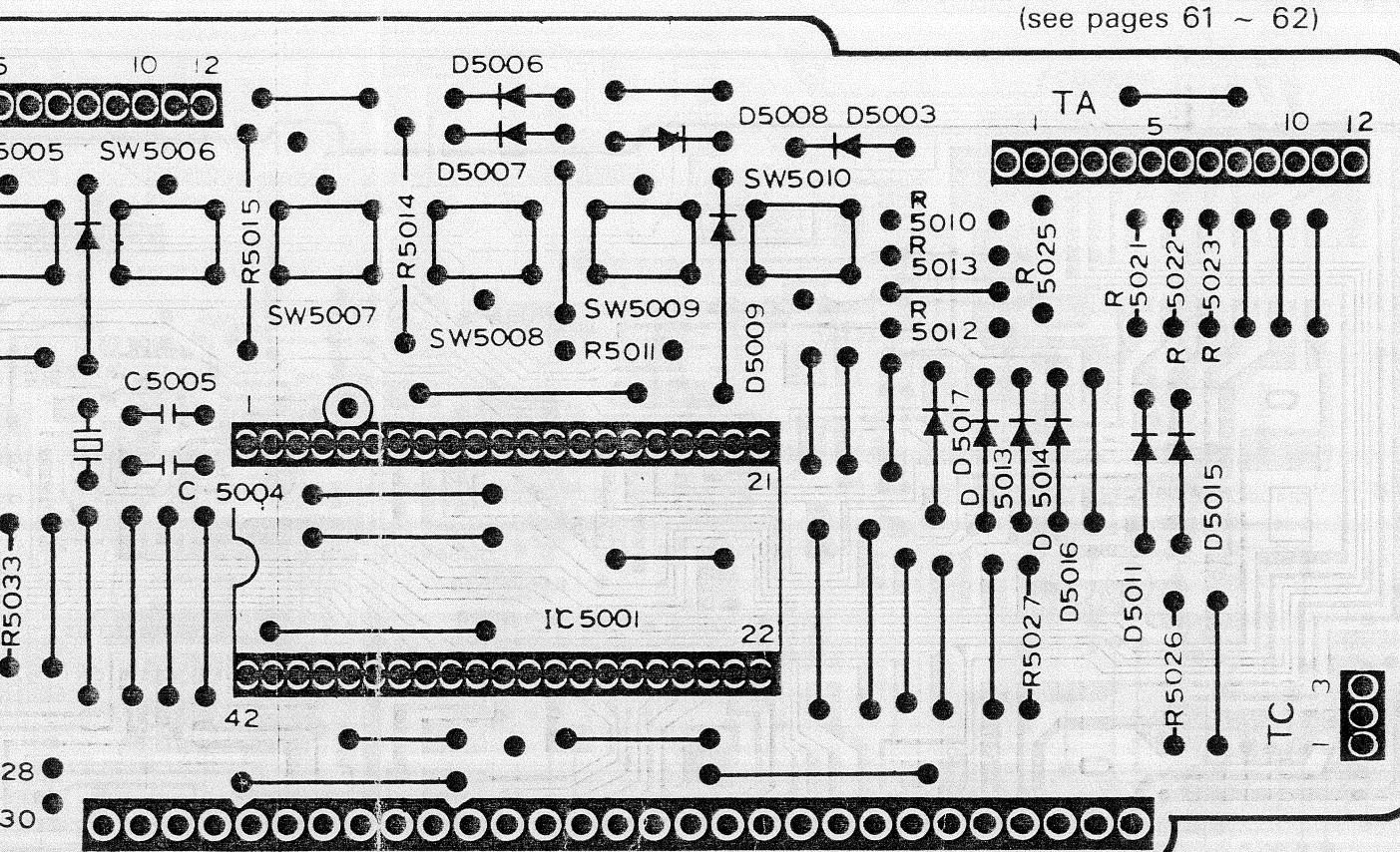
## PWB-J, LED CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 79.  
(see pages 59 ~ 60)



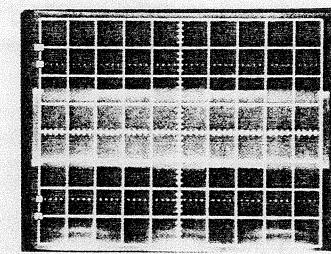
## PWB-T, TIMER CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 77. (see pages 59 ~ 60)

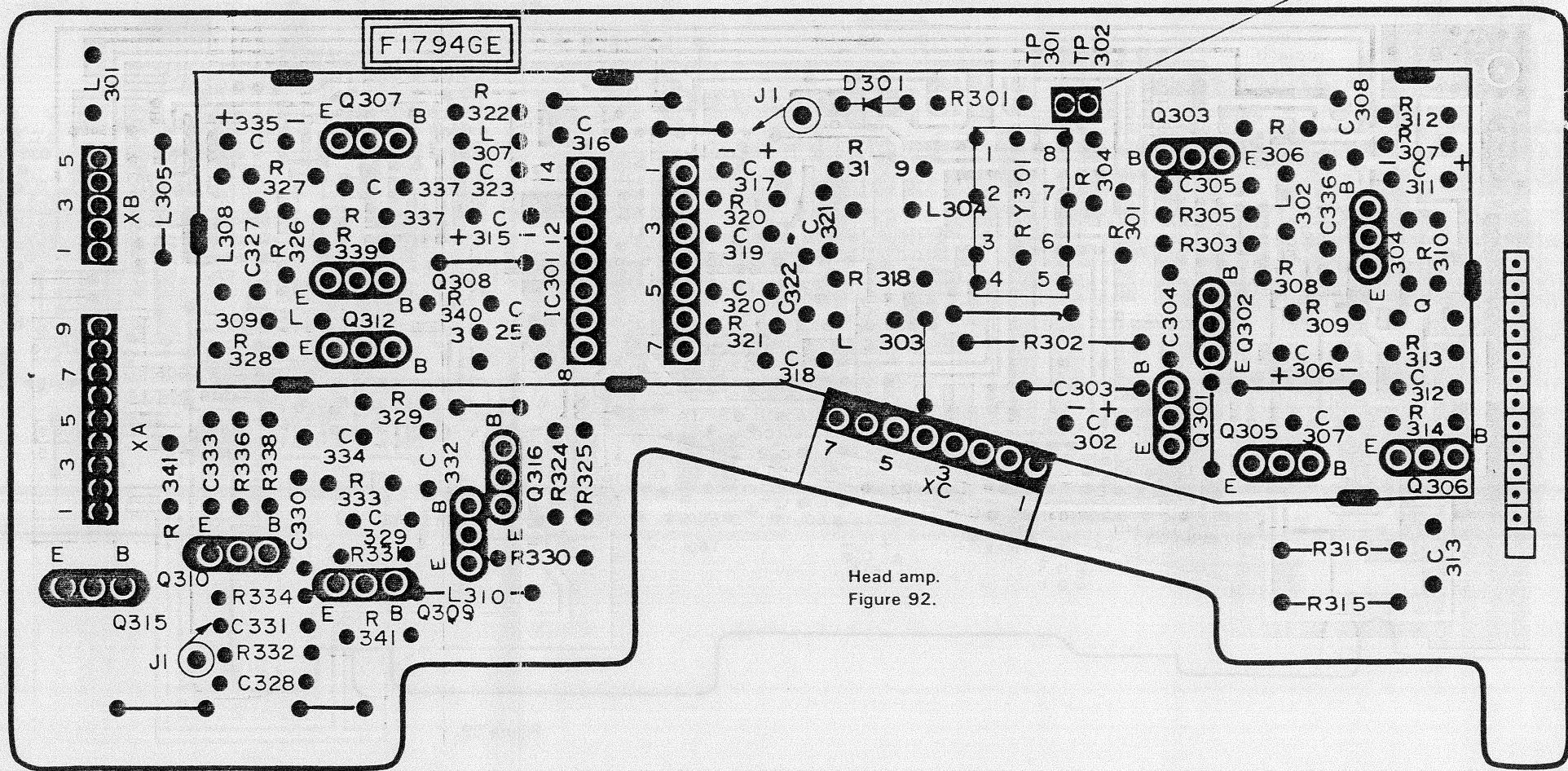


## PWB-X, HEAD AMP CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 80.  
(see pages 61 ~ 62)



• TP301  
Record current  
50mV/division  
5 msec./division  
Record mode-



## PWB-P, POWER CIRCUIT WIRING SIDE PWB

NOTE: For schematic diagram, refer to Figure 81. (see pages 63 ~ 64)

A  
B  
C  
D  
E  
F  
G  
H

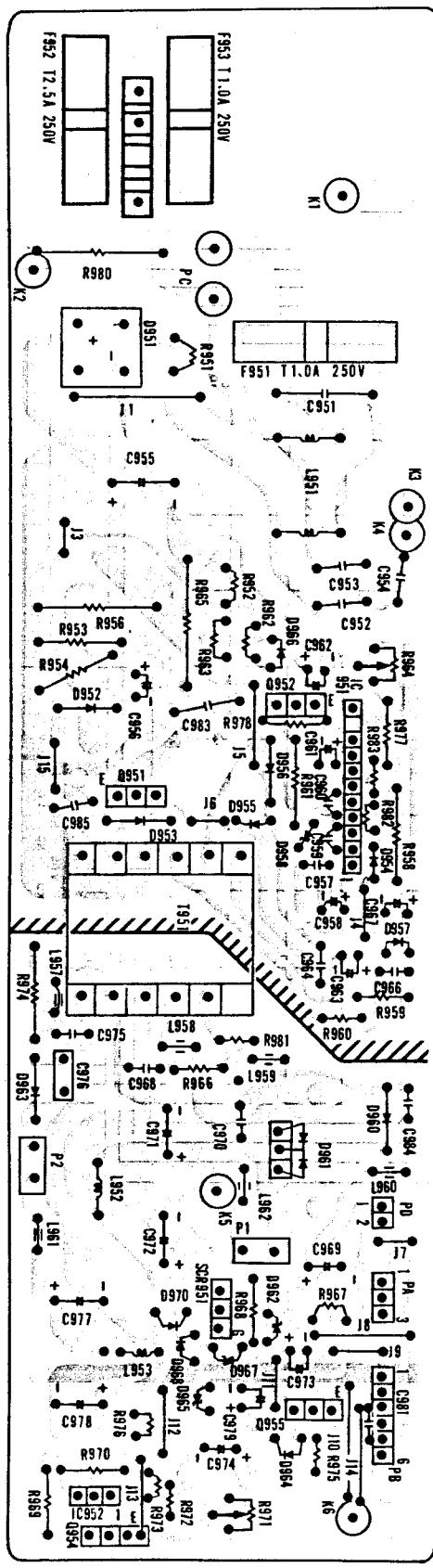


Figure 93.

## REMOTE CONTROL CIRCUIT SCHEMATIC DIAGRAM

A

B

C

D

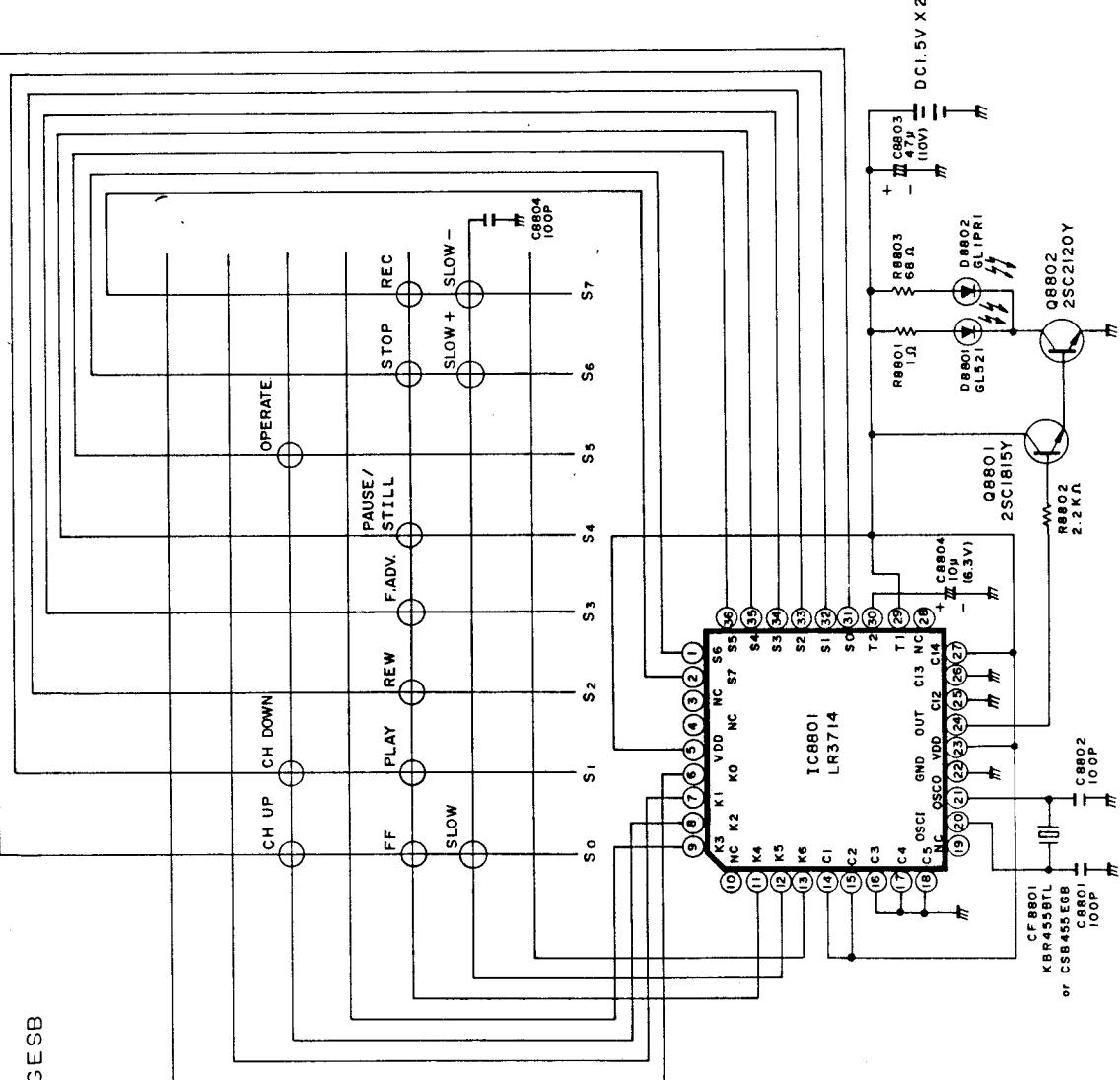
E

F

G

H

RRMCGO124GESB



# PARTS LIST

## PARTS REPLACEMENT

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by  $\Delta$  in the Replacement Parts Lists. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

### "HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- |                 |                |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO.    |
| 3. PART NO.     | 4. DESCRIPTION |
| 5. CODE         |                |

REF. NO.	PART NO.	DESCRIPTION	CODE
PRINTED WIRING BOARD ASS'Y (Not Replacement Item)			
PWB-A	DUNTK1920HE50	Y/C, Servo circuit	-
PWB-E	DUNTK1731HE04	System controller circuit	-
PWB-F	DUNTK1732HE50	Chroma circuit	-
PWB-H	DUNTK1727HE02	Operation circuit	-
PWB-I	DUNTK1729HE04	Tuner IF/Audio circuit	-
PWB-J	DUNTK1734HE00	LED circuit	-
PWB-T	DUNTK1728HE01	Timer circuit	-
PWB-X	DUNTK1794HE50	Head amp circuit	-
PWB-P	RDENC0030GEZZ	Power circuit	-

### PWB-A

### TRANSISTORS

Q201	VS2SC1815YW-1	Switching	AC
Q202	VC2SC3401// - 1	Switching	AD
Q203	VS2SC3401// - 1	Switching	AD
Q204	VS2SC945APQ1E	Emitter follower	AB
Q205	VS2SC3401// - 1	Switching	AD
Q206	VS2SC945APQ1E	Switching	AB
Q208	VS2SA733APQ1E	Inverter	AC
Q209	VS2SC3401// - 1	Mute	AD
Q210	VS2SA950-Y/1E	Switching	AD
Q211	VS2SC945APQ1E	Switching	AB
Q212	VS2SC3401// - 1	Switching	AD
Q401	VS2SC945APQ1E	Equalizer amp.	AB
Q402	VS2SC3401// - 1	Inverter	AD
Q403	VS2SC945APQ1E	Switching	AB
Q404	VS2SA950-Y/1E	Buffer	AD
Q405	VS2SA733APQ1E	Emitter follower	AC
Q406	VS2SC945APQ1E	Emitter follower	AB
Q407	VS2SC945APQ1E	Equalizer amp.	AB
Q408	VS2SC945APQ1E	Switching	AB
Q409	VS2SC3401// - 1	Switching	AD
Q501	VS2SA733APQ1E	Emitter follower switching	AC
Q502	VS2SA733APQ1E	Emitter follower switching	AC
Q503	VS2SC945APQ1E	Switching	AB
Q504	VS2SC3401// - 1	Switching	AD
Q505	VS2SC3401// - 1	Switching	AD
Q506	VS2SC945APQ1E	Emitter follower	AB
Q507	VS2SA733APQ1E	Amp.	AC
Q508	VS2SC945APQ1E	Emitter follower	AB
Q509	VS2SC945APQ1E	Emitter follower	AB
Q510	VS2SC945APQ1E	Emitter follower	AB
Q511	VS2SA733APQ1E	Amp.	AC
Q512	VS2SA733APQ1E	Amp.	AC
Q513	VS2SC945APQ1E	Emitter follower	AB
Q514	VS2SC945APQ1E	Emitter follower	AB
Q515	VS2SC945APQ1E	Amp.	AB
Q516	VS2SC945APQ1E	Emitter follower	AB
Q517	VS2SC945APQ1E	Oscillator	AB
Q518	VS2SC3401// - 1	Switching	AD
Q519	VS2SA733APQ1E	Inverter	AC
Q520	VS2SC1815YW1E	5V regulator	AB
Q521	VS2SA733APQ1E	B/W colour switching	AC
Q522	VS2SC945APQ1E	Switching	AB
Q523	VS2SA733APQ1E	Buffer	AC
Q524	VS2SC3401// - 1	Inverter	AD
Q525	VS2SC3401// - 1	Inverter	AD
Q526	VS2SA733APQ1E	Emitter follower switching	AC
Q527	VS2SC945APQ1E	Emitter follower	AB
Q528	VS2SC3401// - 1	Switching	AD
Q529	VS2SC945APQ1E	Emitter follower	AB
Q530	VS2SC3401// - 1	Switching	AD
Q531	VS2SC945APQ1E	Switching	AB
Q701	VS2SC3401// - 1	Pull up switching	AD
Q702	VS2SC3401// - 1	Unloading switching	AD
Q703	VS2SA1347// - 1	Buffer	AB
Q704	VS2SC945APQ1E	Inverter	AB
Q705	VS2SA733APQ1E	Capstan motor mute	AC
Q706	VS2SA733APQ1E	Drum motor mute	AC
Q714	VS2SA1347// - 1	Video search control 3 switching	AB
Q715	VS2SC3401// - 1	Slow/Still low switching	AD
Q716	VS2SC945APQ1E	Video search control 1,2 switching	AB
Q717	VS2SC945APQ1E	Capstan motor mute switching	AB
Q718	VS2SA1347// - 1	NTSC 4H/6H on switching	AB
Q719	VS2SA733APQ1E	Standard play on switching	AC
Q723	VS2SC2021-R-1	Clock amp.	AB
Q724	VS2SC3401// - 1	Drum motor mute	AD
Q725	VS2SC945APQ1E	Slow/Still Capstan motor mute	AB
Q726	VS2SA1347// - 1	Standard play 2H switching	AB
Q727	VS2SC3401// - 1	3H on switching	
Q728	VS2SC1983// - 1	5V regulator	
Q729	VS2SC945APQ1E	Error amp.	
Q730	VS2SA1347// - 1	Switching	
Q731	VS2SA1347// - 1	Switching	
Q732	VS2SA1347// - 1	Mute control	
Q733	VS2SC3401// - 1	Mute control	
Q734	VS2SC3401// - 1	Slow/Still drur mute	
Q735	VS2SC945APQ1E	Capstan FG	
Q3010	VS2SA1347// - 1	2H 5V switr	
Q3012	VS2SC945APQ1E	Record dete	
Q3013	VS2SA1347// - 1	Switching	
Q3014	VS2SC3401// - 1	Switching	
Q3015	VS2SC945APQ1E	Playback de switching	
Q3017	VS2SC945APQ1E	Emitter fol	
Q7001	VS2SA1347// - 1	2H switch	
Q7002	VS2SC945APQ1E	2H switc	

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q7003	VS2SA1347// - 1	3H switching	AB	D729	VHD1SS119// - 1	Diode (1SS119)	AB
Q7004	VS2SA1347// - 1	2H switching	AB				
Q7005	VS2SC945APQ1E	Inverter	AB	733,			
Q7006	VS2SA1347// - 1	Reverse buffer	AB	735			
Q7007	VS2SA1347// - 1	Buffer	AB				
Q7008	VS2SC3401// - 1	Inverter	AD	737,			
Q7009	VS2SA1347// - 1	3H switching	AB	739			
Q7010	VS2SC945APQ1E	Inverter	AB				
Q7012	VS2SA1347// - 1	Buffer	AB	741			
Q7013	VS2SC3401// - 1	Switching	AD	D3006,	VHD1SS119// - 1	Diode (1SS119)	AB
Q7015	VS2SA1347// - 1	Inverter	AB	3007,			
Q7016	VS2SC3401// - 1	Inverter	AD	3009,			
Q7017	VS2SA1347// - 1	Buffer	AB	3010,			
Q7018	VS2SC3401// - 1	3H switching	AB	3011,			
Q7019	VS2SC3401// - 1	Mute control	AD	3012,			
Q7020	VS2SA1347// - 1	Buffer	AB	3013			
Q7021	VS2SC3401// - 1	Inverter	AD	D7002,	VHD1SS119// - 1	Diode (1SS119)	AB
Q7023	VS2SA1347// - 1	Buffer	AB	7003,			
Q7024	VS2SA733APQ1E	Inverter	AC	7005,			
Q7025	VS2SC945APQ1E	Noise advance	AB	7007,			
Q7026	VS2SC3401// - 1	Switching	AD	7008,			
Q7027	VS2SA1347// - 1	Switching	AB	7010,			
				7014			
					7017		
INTEGRATED CIRCUITS				CAPACITORS			
IC201	VHi AN3215K// - 1	Video signal processor	AT	C218	RC- EZ0106TAZZ	470µF, 10V, Electrolytic	AC
IC202	VHi TA7348P// - 1	Video switching	AK	C415	VCEAE1AW107M	100µF, 10V, Electrolytic	AB
IC401	VHi AN3320K// - 1	Playback video processor	AQ	C426	VCE9EA1HW105M	1µF, 50V, Electrolytic (non-polar)	AC
IC402	VHi BA7004// - 1	Test signal generator	AK	C436	VCEAE1CW107M	100µF, 16V, Electrolytic	AC
IC501	VHi HA11871NT1	Chroma signal processor	AV	C437	RC- EZ0106TAZZ	470µF, 10V, Electrolytic	AC
IC701	VHi AN6359N// - 1	Capstan I/O	AU	C702	VCE9EA1HW105M	1µF, 50V, Electrolytic (non-polar)	AC
IC702	RH- i X0162GEZZ	Servo main	AW	C709	VCE9EA1HW225M	2.2µF, 50V, Electrolytic (non-polar)	AB
IC703	VHi AN6346N// - 1	Drum I/O	AQ	C712	VCE9EA1CW106M	10µF, 16V, Electrolytic (non-polar)	AC
IC705	VHi UPD4069U// - 1	Inverter array	AE	C721	VCE9EA1HW225M	2.2µF, 50V, Electrolytic (non-polar)	AB
IC706	VHi UPC358C// - 1	Reference voltage amp.	AD	C744	VCEAEAOJW107M	100µF, 6.3V, Electrolytic	AB
IC707	VHi i R3702// - 1	Amp.	AF	C773	RC- EZ0116TAZZ	220µF, 10V, Electrolytic	AC
IC3003	VHi UMPCC339C// - 1	50Hz/60Hz system detector	AH	C3007	VCEAE1AW107M	100µF, 10V, Electrolytic	AB
IC3004	VHi BA7007// - 1	MESECAM detector	AM	C3017	VCEAE1CW107M	100µF, 16V, Electrolytic	AC
IC7001	VHi BA877L// - 1	Frame advance control	AQ	C3019	VCE9EA1HW105M	1µF, 50V, Electrolytic (non-polar)	AC
IC7002	VHi BAL6309// - 1	False vertical sync.	AP	C7009	VCSATA1CE335K	3.3µF, 16V, Electrolytic (tantalum)	AC
DIODES				CONTROLS			
D202	VHD1SS119// - 1	Diode (1SS119)	AB	R213	RVR- M7164TAZZ	10K ohm, Pot., Deviation adj.	AE
2	VHD1SS119// - 1	Diode (1SS119)	AB	R214	RVR- M7164TAZZ	10K ohm, Pot., Carrier adj.	AE
	- EX0020GEZZ	Diode (RD5.1EB3)	AE	R217	RVR- B7054TAZZ	47K ohm, Pot., Dark clip adj.	AD
	D1SS119// - 1	Diode (1SS119)	AB	R218	RVR- B7054TAZZ	47K ohm, Pot., White clip adj.	AD
	1SS119// - 1	Diode (1SS119)	AB	R223	RVR- B7054TAZZ	47K ohm, Pot., Electric to Electric adj.	AD
	012GEZZ	Diode (RD3.9EB)	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
R247	RVR - M7129TAZZ	1K ohm, Pot., Record luminance level adj.	AC	L502	VP - DF 150K0000	15μH	AB
R411	RVR - B7054TAZZ	47K ohm, Pot., Playback luminance level adj.	AD	L503	VP - DF 120K0000	12μH	AB
R415	RVR - M7131TAZZ	2.2K ohm, Pot., Line noise canceller adj.	AC	L504	RCi LP0015GEZZ	8.2mH	AD
R517	RVR - M7164TAZZ	10K ohm, Pot., Automatic phase control adj.	AE	L505	VP - DF 221K0000	220μH	AB
R542	RVR - B4002CEZZ	4.7K ohm, Pot., MESECAM colour adj.	AC	L506	VP - LK561K0000	560μH	AB
R556	RVR - M7135TAZZ	10K ohm, Pot., Carrier balance adj.	AC	L507	VP - DF 221K0000	220μH	AB
R558	RVR - M7164TAZZ	10K ohm, Pot., Automatic frequency control adj.	AE	L508	VP - LK221K0000	220μH	AB
R561	RVR - M7131TAZZ	2.2K ohm, Pot., Record colour level adj.	AC	L509,	VP - DF 221K0000	220μH	AB
R751	RVR - M7141TAZZ	100K ohm, Pot., Playback tracking preset	AC	510	VP - DF 221K0000	220μH	AB
R753	RVR - M7141TAZZ	100K ohm, Pot., 3H SP Channel-1	AC	L701	VP - LK680K0000	68μH	AC
R755	RVR - M7141TAZZ	100K ohm, Pot., 3H SP Channel-2	AC	L702	VP - DF 221K0000	220μH	AC
R791	RVR - M7147TAZZ	1M ohm, Pot., 2H SP Channel-1	AC	L704	VP - DF 820K0000	82μH	AG
R793	RVR - M7147TAZZ	1M ohm, Pot., 2H SP Channel-2	AC	L3001,	VP - DF 221K0000	220μH	AB
R3068	RVR - M7164TAZZ	10K ohm, Pot., Playback system detector adj.	AE	3002	VP - YF 682J0000	6.8mH	AC
R3070	RVR - M7166TAZZ	22K ohm, Pot., Record system detector adj.	AE	L3003	VP - YF 153J0000	15mH	AC
R7001	RVR - M7141TAZZ	100K ohm, Pot., 2H Slow/Still tracking preset	AC	FL201	RMPTD0219GEZZ	Low pass filter	AG
R7002	RVR - M7141TAZZ	100K ohm, Pot., 3H Slow/Still tracking preset	AC	FL202	RMPTD0220GEZZ	Equalizer	AK
R7043	RVR - M7141TAZZ	100K ohm, Pot., 3H S/S False vertical sync.	AC	FL401	RMPTD0086GEZZ	Radio frequency equalizer	AG
R7044	RVR - M7141TAZZ	100K ohm, Pot., 2H S/S False vertical sync.	AC	FL402	RFi LA0005GEZZ	TSG filter	AE
R7052	RVR - M7141TAZZ	100K ohm, Pot., Brake monomultivibrator	AC	FL501	RMPTD0234GEZZ	5.06MHz Band pass filter	AF
R7065	RVR - M7141TAZZ	100K ohm, Pot., Noise advance adj.	AC	FL502	RMPTD0221GEZZ	4.43MHz Band pass filter	AK
R7707	RVR - M7129TAZZ	1K ohm, Pot., 5V adj.	AC	FL503	RMPTD0126GEZZ	1.2MHz Low pass filter	AK
				FL3001	RFi LC0001CEZZ	4.5MHz Band pass filter	AE
				DL401	RCi LZ0199GEZZ	Delay line (1H)	AM
				DL501	RCi LZ0195GEZZ	Delay line (NTSC 4.43MHz)	AR
				DL502	RCi LZ0191GEZZ	Delay line (2H)	AM
MISCELLANEOUS							
C559	RT6 - H1048GEZZ	20pF, 4.44MHz Oscillator	AC	X501	RCRSB0002CEZZ	4.43MHz Oscillator	AM
				X502	RCRSB0008GEZZ	4.44MHz Oscillator	AL
				SW401	QSW - S0079GEZZ	TSG Switch	AE
				AC	QPL GN1078GEZZ	Plug (10 pin)	AC
				AD	QPL GN1178GEZZ	Plug (11 pin)	AC
				AJ	QPL GN1278GEZZ	Plug (12 pin)	AC
				AN	QPL GN0778GEZZ	Plug (7 pin)	AC
				AO	QPL GN0378GEZZ	Plug (3 pin)	AB
				AP	QPL GN1078GEZZ	Plug (10 pin)	AC
				AR	QPL GN0878GEZZ	Plug (8 pin)	AC
				AS	QPL GN0578GEZZ	Plug (5 pin)	AB
				AT	QPL GN1078GEZZ	Plug (10 pin)	AC
				AU	QPL GN0578GEZZ	Plug (5 pin)	AB
				AW	QPL GN0878GEZZ	Plug (8 pin)	AC
				AI	QS6 CN0240GEZZ	Socket	AA
				AV	QS6 CN0257GEZZ	Socket	AA
				AH	QS6 CN0540GEZZ	Socket	AA
					QJ AKE0040GEZZ	Audio jack	AD
					QJ AKE0044GEZZ	Camera pause jack	AD
					QJ AKZ0003GEZZ	BNC Connector	AZ
PWB-E							
TRANSISTORS							
				Q803	VS2SC945APQ1E	Reel pulse amp.	AB
				Q804	VS2SD655-DE1E	Brake drive	AC
				Q805	VS2SC945APQ1E	Slave pulse amp.	AB

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q806	VS2SC945APQ1E	Master pulse amp.	AB	EA	QPLGN0978GEZZ	Plug (9 pin)	AC
Q807	VS2SC3401/-1	Dew warning switching	AD	EB	QPLGN0378GEZZ	Plug (3 pin)	AB
Q808	VS2SC945APQ1E	Switching	AB	EC	QPLGN0278GEZZ	Plug (2 pin)	AA
Q809	VS2SC945APQ1E	Amp.	AB	EF	QPLGN0578GEZZ	Plug (5 pin)	AB
Q810	VS2SC945APQ1E	Amp.	AB	EG	QPLGN1078GEZZ	Plug (10 pin)	AC
Q811	VS2SA733APQ1E	All clear	AC	EH	QPLGN0578GEZZ	Plug (5 pin)	AB
Q812	VS2SA950-Y/1E	After loading playback 5V	AD	EM	QPLGN0578GEZZ	Plug (5 pin)	AB
Q813	VS2SC945APQ1E	Camera pause switching	AB	EN	QPLGN0778GEZZ	Plug (7 pin)	AC
Q816	VS2SB772-PQ-1	Power control 12V regulator	AD				
Q817	VS2SA950-Y/1E	Bias control 12V	AD				
Q818	VS2SA1347/-1	Audio mute	AB				
Q820	VS2SA950-Y/1E	Playback 5V	AD				
Q821	VS2SA733APQ1E	After loading playback switch	AC				
Q822	VS2SA733APQ1E	Bias control	AC	Q5701	VS2SC945APQ1E	NT3.58 Playback chroma-out	AB
Q823	VS2SA733APQ1E	Power control	AC	Q5702	VS2SC945APQ1E	NT3.58 Record chroma-out	AB
Q824	VS2SC3401/-1	Inverter	AD	Q5703	VS2SC945APQ1E	Switch	AB
Q825	VS2SA1347/-1	Video mute	AB	Q5704	VS2SC945APQ1E	Playback SECAM chroma-amp.	AB
Q3001	VS2SA733APQ1E	Buffer	AC	Q5705	VS2SC945APQ1E	Playback SECAM chroma-out	AB
Q3002	VS2SA733APQ1E	Buffer	AC	Q5706	VS2SC945APQ1E	Record SECAM chroma-out	AB
Q3003	VS2SA733APQ1E	Buffer	AC	Q5707	VS2SC945APQ1E	Playback chroma-amp.	AB
Q3004	VS2SA733APQ1E	Buffer	AC	Q5708	VS2SC945APQ1E	Gate pulse generator	AB
Q3005	VS2SC3401/-1	Inverter	AD	Q5709	VS2SC1815YW-1	5V regulator	AC
Q3006	VS2SA733APQ1E	Buffer	AC	Q5711	VS2SA733APQ1E	Record chroma-switch	AC
Q3007	VS2SA733APQ1E	Buffer	AC	Q5712	VS2SA733APQ1E	Playback chroma-amp.	AC
Q3008	VS2SA1347/-1	Switching	AB	Q5713	VS2SA733APQ1E	NTSC 3.58 auto select	AC
Q3009	VS2SC945AP-1	Buffer	AB	Q5714	VS2SC3401/-1	NTSC 3.58 auto select	AC
				Q5715	VS2SA937-Q-1	Playback gate pulse Amp.	AD
				Q5716			AC
<b>INTEGRATED CIRCUITS</b>				<b>INTEGRATED CIRCUITS</b>			
IC801	RH-i X0161GEZZ	System control	AY	IC5701	VHi HA11811NT2	National television system committee 3.58 colour	AW
IC802	VHi TA7288P/-1	Cassette/Loading motor control	AK	IC5702	VHi BA7107/-1	SECAM colour	AT
IC803	VHi i R2C32/-1	Invertor current driver	AG	IC5703	VHi BA7007/-1	SECAM auto selector	AM
IC3001	VHi TC4023BP-1	Colour system logic	AF				
IC3002	VHi TC4023BP-1	Colour system logic	AF				
<b>DIODES</b>				<b>DIODES</b>			
D803	VHDERB1201/-1	Diode (ERB1201)	AB	D5702	VHD1SS119/-1	Diode (1SS119)	AB
D804, 805, 810, 812, 813	VHD1SS119/-1	Diode (1SS119)	AB	5705			
D3001   3005, 3014	VHD1SS119/-1	Diode (1SS119)	AB	D5706	RH- EX0020GEZZ	Diode (RD5.1EB3)	AE
<b>CAPACITOR</b>				<b>CAPACITOR</b>			
C802	RC-EZ0103CEZZ	220μF, 25V, Electrolytic	AC	C5720	VCEAEA1CW107M	100μF, 16V, Electrolytic	AC
<b>COIL</b>				<b>CONTROLS</b>			
L801	VP-DF220K0000	22μH	AB	R5810	RVR-B4103GEZZ	2.2K ohm, Pot., NT. record chroma level adj.	AC
<b>MISCELLANEOUS</b>				R5811	RVR-B4109GEZZ	22K ohm, Pot., Automatic phase control adj. (NTSC)	AD
X801	RFI LC0031GEZZ	Ceramic oscillator	AG				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
R5812	RVR- B4107GEZZ	10K ohm, Pot., Automatic fine tuning adj. (NTSC)	AC	D8101	RH- PX0076GEZZ	DIODES	
R5813	RVR- B4105GEZZ	4.7K ohm, Pot., SECAM record chroma level adj.	AD	D8102	RH- DX0142CEZZ	LED (PLAY) Diode (1SS133)	AC AB
R5814	RVR- B4106GEZZ	6.8K ohm, Pot., Gate 1 adj.	AC	8112			
R5815	RVR- B4106GEZZ	6.8K ohm, Pot., Gate 2 adj.	AC	D8113, 8114,	RH- PX0051GEZZ	LED (Auto) LED (Phase alternation by line)	AC
R5816	RVR- B4109GEZZ	22K ohm, Pot., Carrier leak adj.	AD	8115, 8116, 8117, 8118		LED (SECAM) LED (ME-SECAM) LED (NT4.43) LED (NT3.58)	
<b>COILS AND TRANSFORMERS</b>				D8119	RH- EX0121GEZZ	Diode (HZS3.3EB1)	AB
L5701 5704	VP- DF221K0000	220μH	AB	D8120	RH- DX0142CEZZ	Diode (1SS133)	AB
L5705	VP- DF101K0000	100μH	AB	<b>CONTROLS</b>			
L5706 5708	VP- DF221K0000	220μH	AB	R8122	RVR- B4262GEZZ	10K ohm, Pot., Picture tone	AD
L5710	VP- MK271K0000	270μH	AB	R8123	RVR- B4261GEZZ	200K ohm, Pot., Playback tracking adj.	AD
L5711	RCi LP0014GEZZ	6.8mH	AD	R8124	RVR- B4261GEZZ	200K ohm, Pot., Slow tracking	AD
L5712	RCi LP0018GEZZ	15mH	AD	<b>MISCELLANEOUS</b>			
L5713	VP- DF221K0000	220μH	AB	X8101	RCRSB0048GEZZ	Clock modulator	AR
L5714	VP- LK471K0000	470μH	AB	SW8101	QSW- K0028GEZZ	Rewind switch	AF
FL5701	RMPTD0126GEZZ	1.2MHz low pass filter	AK	SW8102	QSW- K0046GEZZ	Playback switch	AC
FL5702	RMPTD0180GEZZ	4.2MHz band pass filter	AG	SW8103	QSW- K0028GEZZ	Fast forward switch	AF
FL5703	RMPTD0222GEZZ	3.58MHz band pass filter	AK	SW8104	QSW- K0027GEZZ	Stop switch	AD
FL5704	RFi LG0014GEZZ	4.17MHz band pass filter	AE	SW8105, 8106	QSW- K0028GEZZ	Pause switch	AF
FL5705	RMPTD0223GEZZ	1.4MHz low pass filter	AE	SW8107, 8109	QSW- K0030GEZZ	Record switch	
FL5706, 5707	RMPTD0149GEZZ	4.3MHz band pass filter	AH	8110, 8111, 8112, 8113, 8114		Slow switch	AB
DL5701	RCi LZ0148GEZZ	4.43MHz band pass filter	AS			Simple recording timer switch	
T5701, 5702	RCi LV0013GEZZ	1H delay line	AF			Counter/timer switch	
T5703	RCi LV0015GEZZ	Bell	AF			Counter reset switch	
		Bell				Counter memory switch	
		Bell				Channel up switch	
						Channel down switch	
<b>MISCELLANEOUS</b>				SW8115	QSW- S0081GEZZ	Auto switch	AE
X5701	RCRSB0009GEZZ	3.58MHz Oscillator	AL	SW8116	QSW- S0085GEZZ	SP-LP switch	AD
FA	QS6CN1040GEZZ	Socket	AB	8117		Camera-tuner switch	
FB	QS6CN1140GEZZ	Socket	AB	SW8118	QSW- P0108GEZZ	System switch	AL
<b>PWB-H</b>				SW8119	QSW- K0030GEZZ	Frame advance switch	AB
<b>TRANSISTORS</b>				HA	QPL GN1278GEZZ	Plug (12 pin)	AC
Q8101	VSDTC144F / - 1	Rewind switching	AB	HB	QPL GN1278GEZZ	Plug (12 pin)	AC
Q8102	VS2SA937- Q / - 1	Playback light emitting diode switching	AC	HD	QPL GN0778GEZZ	Plug (7 pin)	AC
Q8103	VSDTC144F / / - 1	Counter switching	AB	<b>PWB-I</b>			
Q8104	VS2SC2021- Q- 1	Switching	AB	<b>TRANSISTORS</b>			
Q8105	VSDTA144F / / - 1	Buffer	AC	Q601	VS2SD468- C / - 1	Bias oscillator	AD
Q8106	VS2SA937- Q / - 1	Cassette down switching	AC	Q602	VS2SC945APQ1E	Oscillator control	AB
Q8107	VSDTC144F / / - 1	Switching	AB	Q605	VS2SC3401 / / - 1	REC. mute	AD
Q8108	VSDTA144F / / - 1	switching	AC	Q606	VS2SC3401 / / - 1	PAL switching	AD
<b>INTEGRATED CIRCUITS</b>				Q607	VS2SC945APQ1E	11V regulator	AB
IC8101	VHi TMS1035 / - 1	Mode decoder	AM				
IC8102	VHi UPD4081B- 1	AND gate	AE				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q608	VS2SC3401// - 1	Audio mute	AD	606			
Q610	VS2SC3401// - 1	Switching	AD	610			
Q611	VS2SD655- DE1E	Tuner mute	AC				
Q612	VS2SA1347// - 1	Switching	AB	D1402,	VHD1SS119// - 1	Diode (1SS119)	AB
Q613	VS2SD655- DE1E	AUX mute	AC	1404			
Q614	VS2SC3401// - 1	PB 5V Generator	AD	1407			
Q615	VS2SC3401// - 1	LP switching	AD	D1409	RH- EX0215CEZZ	Diode (RD5.1JB)	AB
Q616	VS2SC3401// - 1	LP switching	AD	D1410	RH- EX0209CEZZ	Diode (HZ5B1)	AB
Q1401	VS2SA733APQ1E	Channel-LED mute	AC	D1411	RH- EX0010GEZZ	Diode (RD5.6EB)	AB
Q1402	VS2SA733APQ1E	G1 driver	AC	D1501	VHD1SS119// - 1	Diode (1SS119)	AB
Q1403	VS2SA733APQ1E	G0 driver	AC				
Q1404	VS2SC383- WT- 1	VT pulse amp.	AE				
Q1405	VS2SC3401// - 1	Resetting	AD				
Q1406	VS2SA733APQ1E	Constant current regulator	AC				
Q1407	VS2SC945APQ1E	5V regulator	AB	C603	VCQPKA2AA183J	0.018µF, 100V, Polypro	AB
Q1408	VS2SC945APQ1E	Automatic fine tuning	AB	C626	VCEAEA1CW107M	100µF, 16V, Electrolytic	AC
Q1501	VS2SC945APQ1E	mute	AB	C1415	VCEAAA1EW107M	100µF, 25V, Electrolytic	AC
Q1502	VS2SC1906// 1E	National television system committee trap. switching	AC	C1528	VCEAEA1CW107M	100µF, 16V, Electrolytic	AC
Q1503	VS2SC3401// - 1	Intermediate frequency tuning amp.	AD				
Q1504	VS2SC3401// - 1	Automatic fine tuning	AD	R643	RVR- M7144TAZZ	330K ohm, Pot., Bias adj.	AC
Q1505	VS2SA733APQ1E	mute	AC	R644	RVR- M7138TAZZ	33K ohm, Pot., Playback audio level adj.	AC
Q1506	VS2SC945APQ1E	Video amp.	AB	R1531	RVR- M7135TAZZ	10K ohm, Pot., Radio frequency automatic gain control adj.	AC
Q1507	VS2SC945APQ1E	Video amp.	AB	R7734	RVR- M4135GEZZ	150K ohm, Pot., PAL LP CH-2 phase adj.	AC
Q1508	VS2SC945APQ1E	Video amp.	AB	R7736	RVR- M4135GEZZ	150K ohm, Pot., PAL LP CH-1 phase adj.	AC
Q1509	VS2SC945APQ1E	Video amp.	AB	R7738	RVR- M7147TAZZ	1M ohm, Pot., NTSC LP CH-2 phase adj.	AC
Q1510	VS2SC3401// - 1	National television system committee switching	AD	R7740	RVR- M7147TAZZ	1M ohm, Pot., NTSC LP CH-1 phase adj.	AC
Q1511	VS2SC3401// - 1	Phase alternation by line-l-switching	AD				
Q1512	VS2SC945APQ1E	Video amp.	AB				
Q7701	VS2SA1347// - 1	Switching	AB				
Q7702	VS2SA1347// - 1	Switching	AB				
Q7703	VS2SA1347// - 1	Switching	AB				
Q7704	VS2SA1347// - 1	Switching	AB				
Q7705	VS2SA1347// - 1	Switching	AB				
Q7706	VS2SA1347// - 1	Switching	AB				
Q7707	VS2SA1347// - 1	Switching	AB				
Q7708	VS2SA1347// - 1	Switching	AB				
INTEGRATED CIRCUITS							
IC601	VHi UPC1513H- 1	Head switching	AH	L601	RCi LP0002GEZZ	1mH	AC
IC602	VHi AN3990// - 1	Record/Playback amp.	AK	L602	RCi LP0015GEZZ	8.2mH	AD
IC1401	RH- i X0154GEZZ	Tuning	AS	L1402	VP- DF221K0000	220µH	AB
IC1402	RH- i X0037CEZZ	31.6V	AF	L1403	VP- DF120K0000	12µH	AB
IC1403	RH- i X0439CEZZ	Channel memory	AQ	L1404	RCi LP0002GEZZ	1mH	AC
IC1501	RH- i X0260CEZZ	Band switching	AF	L1501	VP- DF470K0000	47µH	AB
IC1502	VHi LA7520// - 1	Intermediate frequency tuning amp.	AQ	L1502	VP- DF180K0000	18µH	AB
IC1503	RH- i Z0006CEZZ	Sound intermediate frequency adaptor	AX	L1503,	VP- DF221K0000	220µH	AB
IC1504	VHi TA7347P// - 1	NTSC-PAL video switching	AG	1504	VP- DF560K0000	56µH	AB
IC7701	VHi UPD4011B- 1	NAND gate switching	AE	L1505	VP- DF100K0000	10µH	AB
DIODES				L1506	VP- DF820K0000	82µH	AB
D601, 603, 604,	VHD1SS119// - 1	Diode (1SS119)	AB	L1509	VP- DF221K0000	220µH	AB
				L1510	VP- DF4R7K0000	4.7µH	AB
				L1511	VP- DF221K0000	220µH	AB
				L1512	VP- DF4R7M0000	0.47µH	AB
				L1513	VP- DF221K0000	220µH	AB
				L1514	VP- DFR47M0000	22µH	AB
				L1515	VP- DF220K0000	100µH	AB
				L1517	VP- DF101K0000	Bias trap	AB
				FL601	RCi Li 0052GEZZ	Low pass filter	AE
				FL602	RCi LF0016GEZZ	Filter	AG
				FL1401	RFi LC0024GEZZ	Surface acoustic wave filter	AE
				CF1501	RFi LC0110CEZZ	5.5MHz Filter	AK
				CF1502	RFi LC0011GEZZ		AE

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CF1503	RFI LC0061CEZZ	5.5MHz Filter	AF	D5002	RH- DX0142CEZZ	Diode (1SS133)	AB
CF1504	RFI LC0013CEZZ	Filter	AE				
CF1505	RFI LC0020CEZZ	Filter	AE	5009,			
CF1506	RFI LC0023CEZZ	Filter	AE	5011,			
CF1507	RFI LC0024CEZZ	Filter	AE	5014			
T601	RTRNH0028GEZZ	Oscillator transformer	AE				
T1501	RCI LI 0371CEZZ	National television system committee trap	AD	5018			
T1503	RCI LD0017GEZZ	Automatic fine tuning	AD	D5019	RH- EX0041TAZZ	Diode (RD9.1EB)	AC
T1504	RCI LD0096CEZZ	Detector	AE	D5020,	RH- DX0142CEZZ	Diode (1SS133)	AB
<b>RESISTORS</b>				<b>COIL</b>			
R605	RR- XZ0037TAZZ	4.7 ohm, 1/4W, Fuse resistor	AB	L5001	VP- DF 101K0000	100μH	AB
R1421	RR- XZ0037TAZZ	4.7 ohm, 1/4W, Fuse resistor	AB	<b>MISCELLANEOUS</b>			
<b>MISCELLANEOUS</b>				X5001	RFI LA0011GEZZ	Ceramic oscillator	AD
IA	QPL GN0378GEZZ	Plug (3 pin)	AB	SW5001,	QSW- K0030GEZZ	Eject switch	AB
IB	QPL GN0278GEZZ	Plug (2 pin)	AA	5002,		Operate switch	
IC	QPL GN0346GEZZ	Plug (3 pin)	AA	5003		Normal switch	
ID	QPL GN0378GEZZ	Plug (3 pin)	AB	SW5004	QSW- S0111GEZZ	Timer switch	AE
IE	QPL GN0578GEZZ	Plug (5 pin)	AB	SW5005,	QSW- K0030GEZZ	Clock switch	AB
IF	QPL GN0978GEZZ	Plug (9 pin)	AC	5006,		Program switch	
IG	QPL GN0278GEZZ	Plug (2 pin)	AA	5007,		Minute switch (-)	
IH	QPL GN0478GEZZ	Plug (4 pin)	AB	5008,		Minute switch (+)	
II	QPL GN0878GEZZ	Plug (8 pin)	AC	5009,		Set switch	
IJ	QPL GN0578GEZZ	Plug (5 pin)	AB	5010		Clear switch	
IM	QPL GN0878GEZZ	Plug (8 pin)	AC	TC	QPL GN0578GEZZ	Plug (5 pin)	AB
IN	QPL GN0278GEZZ	Plug (2 pin)	AA	TD	QPL GN1278GEZZ	Plug (12 pin)	AC
SW1401, 1402	QSW- K0030GEZZ	Tuning switch (+)	AB	TB	QSÖCN0340GEZZ	Socket	AA
SW1404	QSW- S0081GEZZ	Tuning switch (-)	AE	DG5001	VVKCP2171 / - 1	Fluorescent display tube	AX
SW1501	QSW- S0081GEZZ	Tuning band switch	AE		RRMCU0029GEZZ	Remote control receiver	AQ
	VTUVTS- 1S2Y //	Sound select switch	BH	<b>PWB-X</b>			
	RDENC0029GEZZ	Tuner		<b>TRANSISTORS</b>			
		DC-DC converter	AW	Q301	VS2SC1959Y / 1 E	Switching	AC
<b>PWB-J</b>				Q302	VS2SC1815YW1E	Switching	AB
<b>DIODE</b>				Q303	VS2SC1815YW1E	Switching	AB
D8501	RH- PX0097GEZZ	LED (Channel)	AM	Q304	VS2SC945APQ1E	REC amp.	AB
				Q305	VS2SC945APQ1E	Amp.	AB
				Q306	VS2SA733APQ1E	Amp.	AC
				Q307	VS2SC945APQ1E	EQ. amp.	AB
				Q308	VS2SC945APQ1E	Emitter follower	AB
				Q309	VS2SC945APQ1E	Switching	AB
				Q310	VS2SC945APQ1E	Switching	AB
				Q311	VS2SC945APQ1E	EQ. amp.	AB
				Q312	VS2SC945APQ1E	Emitter follower	AB
				Q315	VS2SC3401 / - 1	Inverter	AD
				Q316	VS2SC945APQ1E	Emitter follower	AB
<b>TRANSISTORS</b>				<b>INTEGRATED CIRCUIT</b>			
Q5004	VSDTA144F / / - 1	Inverter	AC	IC301	VHI AN3313 / - 1	Head amp.	AN
Q5005	VS2SA937- Q / - 1	Auto clear switching	AC	<b>DIODE</b>			
<b>INTEGRATED CIRCUIT</b>				D301	VHD1SS119 / - 1	Diode (1SS119)	AB
IC5001	RH- i X0153GEZZ	Timer control	AW				
<b>DIODES</b>							
D5001	RH- PX0061GEZZ	LED (Operate)	AG				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
<b>COILS</b>				<b>CAPACITORS</b>			
L301	VP - DU221K0000	220 $\mu$ H	AB	△C951	95KUGZ0076ZZ	0.047 $\mu$ F, 250V, Ceramic	AF
L302	VP - MK150K0000	15 $\mu$ H	AB	△C952,	95KUGCQ102AB	1000pF, 250V, Ceramic	AC
L305	VP - DF221K0000	220 $\mu$ H	AB	△ 953,			
L307	VP - MK330K0000	33 $\mu$ H	AB	△ 954			
L308	VP - DF221K0000	220 $\mu$ H	AB	△C955	95KUGZ0352ZZ	100 $\mu$ F, 450V, Electrolytic	AR
L309	VP - MK150K0000	15 $\mu$ H	AB	C958	95KUGAC100BJ	100 $\mu$ F, 16V, Electrolytic	AB
L310	VP - DF150K0000	15 $\mu$ H	AB	C966	95KUGCZ222AA	2200pF, 500V, Ceramic	AD
<b>MISCELLANEOUS</b>				C967	95KUGAD101BJ	100 $\mu$ F, 25V, Electrolytic	AC
RY301	RRLYZ0038GEZZ	Relay	AM	C968	95KUGCZ331AA	330pF, 500V, Ceramic	AC
XA	QPLGN0980GEZZ	Plug (9 pin)	AC	C969	95KUGAJ470BJ	47 $\mu$ F, 100V, Electrolytic	AD
XB	QPLGN0580GEZZ	Plug (5 pin)	AB	C970	95KUGCZ222AA	2200pF, 500V, Ceramic	AD
XC	QS-CN0824CEZZ	Socket	AC	C971, 972	95KUGAE102BJ	1000 $\mu$ F, 35V, Electrolytic	AD
<b>THE OTHER PARTS</b>				C974	95KUGAC331BJ	330 $\mu$ F, 16V, Electrolytic	AB
	Ti NS - 0668GEZZ	Operation manual	AG	C975	95KUGCF103AD	1000pF, 50V, Ceramic	AB
	RTUNE0265GEZZ	Radio frequency converter	BK	C976	95KUGCZ222AA	2200pF, 500V, Ceramic	AD
	QCNW - 1596GEZZ	Antenna cord	AM	C977, 978	95KUGAD102BJ	1000 $\mu$ F, 25V, Electrolytic	AF
	RRMCG0124GESB	Remote control transmitter	BB	C979	95KUGAC100BJ	100 $\mu$ F, 16V, Electrolytic	AB
				C985	95KUEGG2R0AL	220pF, 1kV, Ceramic	AE
<b>POWER CIRCUIT</b>				<b>CONTROLS</b>			
<b>TRANSISTORS</b>				R964	95KUFAE204AB	200K ohm, Pot., 15V adj.	AD
△Q951	95KUAC0110AZ	Main switching	AP	R971	95KUFAE202AB	2K ohm, Pot., 12V adj.	AD
Q952	95KUAC0026EZ	Muting	AH				
Q953	VS2SC945AP / - 1	Monitor switching	AB				
Q954	95KUAB0019BZ	12V regulator	AG				
Q955	95KUAC0026EZ	5V regulator	AH				
Q956	VS2SA733AP / - 1	Switching	AB				
<b>INTEGRATED CIRCUITS</b>							
IC951	95KUCH0027ZZ	Power control	AU				
IC952	95KUCZ0067ZZ	Regulator	AG				
<b>DIODES</b>							
△D951	95KUBB0005SB	Diode (S2VB60S)	AK	△R951	95KUEGG2R0AL	2 ohm, 5W, Resistor	AE
D952	95KUBC0128AA	Diode (RU1P)	AB	△R952	95KUEFD104AF	100K ohm, 1W, Resistor	AB
D953, 954, 955, 956	95KUBC0033BZ	Diode (ERB43-02)	AD	R953, 954	95KUEFE154AF	150K ohm, 1W, Resistor	AB
D957	95KUBC0108KZ	Diode (10E1N)	AB	R956	95KUEFE224AH	220K ohm, 2W, Resistor	AC
D958	95KUBD0115CZ	Zener diode (RD5.6EB2)	AC	R958	95KUEFD560AF	56 ohm, 1W, Resistor	AB
D960	95KUBC0033CZ	Diode (ERB43-04)	AD	R959	95KUEFD680AF	68 ohm, 1W, Resistor	AB
D961	95KUBB0111AZ	Diode (D5LC-20)	AM	R960	95KUEFD2R0AF	2 ohm, 1W, Resistor	AB
D962	95KUBD0128BZ	Zener diode (RD18EB1)	AC	R965	95KUEGER62AJ	0.62 ohm, 2W, Resistor	AD
D963	95KUBC0119BA	Diode (ERB35-02)	AF	R966, 967	95KUEFE561AH	560 ohm, 2W, Resistor	AB
D964	95KUBA0005AZ	Diode (1SS55)	AB	R974	95KUEFD470AF	47 ohm, 1W, Resistor	AB
D965	95KUBD0114BZ	Zener diode (RD5.1EB1)	AC	△R980	95KUEZ0085ZZ	12M ohm, 1/2W, Resistor	AE
△D966, △ 967	95KUBC0098BZ	Diode (ERC05-08)	AE				
D968	95KUBA0005AZ	Diode (1SS55)	AB				
D969	95KUBD0120CZ	Zener diode (RD9.1EB2)	AC				
D970	95KUBC0122AA	Diode (S3V10)	AF				
<b>COILS AND TRANSFORMER</b>				△L951	RCi LF0070CEZZ	Line filter	AM
				L952	95KUKZ0052ZZ	Filter	AG
				L953	95KUKZ0050ZZ	Filter	AF
				L957	95KBFZ89125Z	Filter	AC
				962			
				△T951	95K830030043	Power transformer	AU
<b>MISCELLANEOUS</b>							
				△F951	95KPJC0308ZZ	Fuse T1A, 250V	AE
				△F952	95KPJC0118ZZ	Fuse T2.5A, 250V	AE
				△F953	95KPJC0308ZZ	Fuse T1A, 250V	AE
				△SCR951	95KUAD0002DZ	Thyristor (High voltage protector)	AL
				△ PA	QACCV2021GEZZ	AC cord	AM
				△ PB	95KPKZ0602ZZ	Plug (3 pin)	AC
				△ PC	95KPKZ0605ZZ	Plug (6 pin)	AC
				△ PD	95KPKZ0131ZZ	Plug (3 pin)	AC
					95KPKZ0442ZZ	Plug (2 pin)	AB

## REMOTE CONTROL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
TRANSISTORS				REMOTE CONTROL CABINET PARTS			
Q8801	VS2SC1815// - 1	LED Driver (2SC1815Y)	AB		DCABA0080AASB	Upper cabinet	AM
Q8802	VS2SC2120Y/- A	LED Driver (2SC2120Y)	AC		GCABBO065AASA	Bottom cabinet	AD
INTEGRATED CIRCUIT					GCÖVH0048PASA	Battery cover	AB
IC8801	RH-iX0478PAZZ	Remote control encoder	AM		MSPRPO214PAZZ	Rubbekey	AF
DIODES AND CRYSTAL					XYBSF26P08000	Screw	AA
D8801	RH-PX0068PAZZ	Infrared LED (GL-521)	AD		JBTN-0663PASA	Button, channel up/down	AA
D8802	RH-PX0108PAZZ	Infrared LED (GL-1PR1)	AB		JBTN-0664PASA	Button, Stop/Play	AB
CF8801	RFILF0027PAZZ or RFILF0010PAZZ	Crystal (CSB455EGB) Crystal (KBR455BTL)	AD AE		JBTN-0665PASA	Button, Rew/FF	AB
CAPACITOR					JBTN-0667PASA	Button, Record	AA
C8804	VCESAUOJE106K	10µF, 6.3V, Tantalum	AD		JBTN-0668PASA	Button, Pause/Still	AA
					JBTN-0669PASA	Button, Frame advance	AA
					JBTN-0676PASA	Button, Slow	AA
					JBTN-0666PASA	Button, Operate	AA
					QTANZ0133PAZZ	Battery terminal (+)	AB
					QTANZ0134PAZZ	Battery terminal (-)	AA
					QTANZ0135PAZZ	Battery terminal (+/-)	AB

## EXPLODED VIEWS AND PARTS LISTS

### MECHANICAL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
501	GCABB1025GES A	Bottom cabinet	AW	514-1	Hi NDP0763GES A	Voltage synthesizer indicator panel	AC
502	PFLT-0006GEZZ	Bottom felt	AB				
503	LHLDF1029GEZZ	P.W.B stopper (Head amplifier)	AC	514-2	GCöVA1302GES A	Voltage synthesizer cover	AH
505	MHNG-1012GEZZ	Hinge	AB	518	QEARP0100GEFW	Earth plate	AC
506	MHNG-1013GEZZ	Hinge	AA	519	XEBSD40P16000	Screw	AA
507	PSPA20047GEZZ	Spacer	AA	520	QTANN9199GEZZ	Antenna terminal	AH
508	LHL DZ1360GE00	LED holder	AC	521	PCLiC1011CEZZ	Rivet	AB
509	LHL DZ1442GEZZ	Fluorescent display holder	AD	522	LHLDP1022GEZZ	LED holder	AC
510	PSPA H0032GEZZ	Spacer	AA	523	LHL DZ1493GEZZ	Operation PWB holder	AE
512	LHL DZ1373GEZZ	Playback LED holder	AF	524	JKNBP1027GES A	Timer switch knob	AC
514	CCöVA1302GE01	Voltage synthesizer panel ass'y	AL	525	LHLDF1042GEZZ	PWB holder	AC
				526	PSPAV0029GE00	Spacer	AA
				527	LHLDF1047GEZZ	PWB holder	AC
				528	QEARP0174GEFW	Earth plate	AE

## MECHANICAL PARTS DIAGRAM

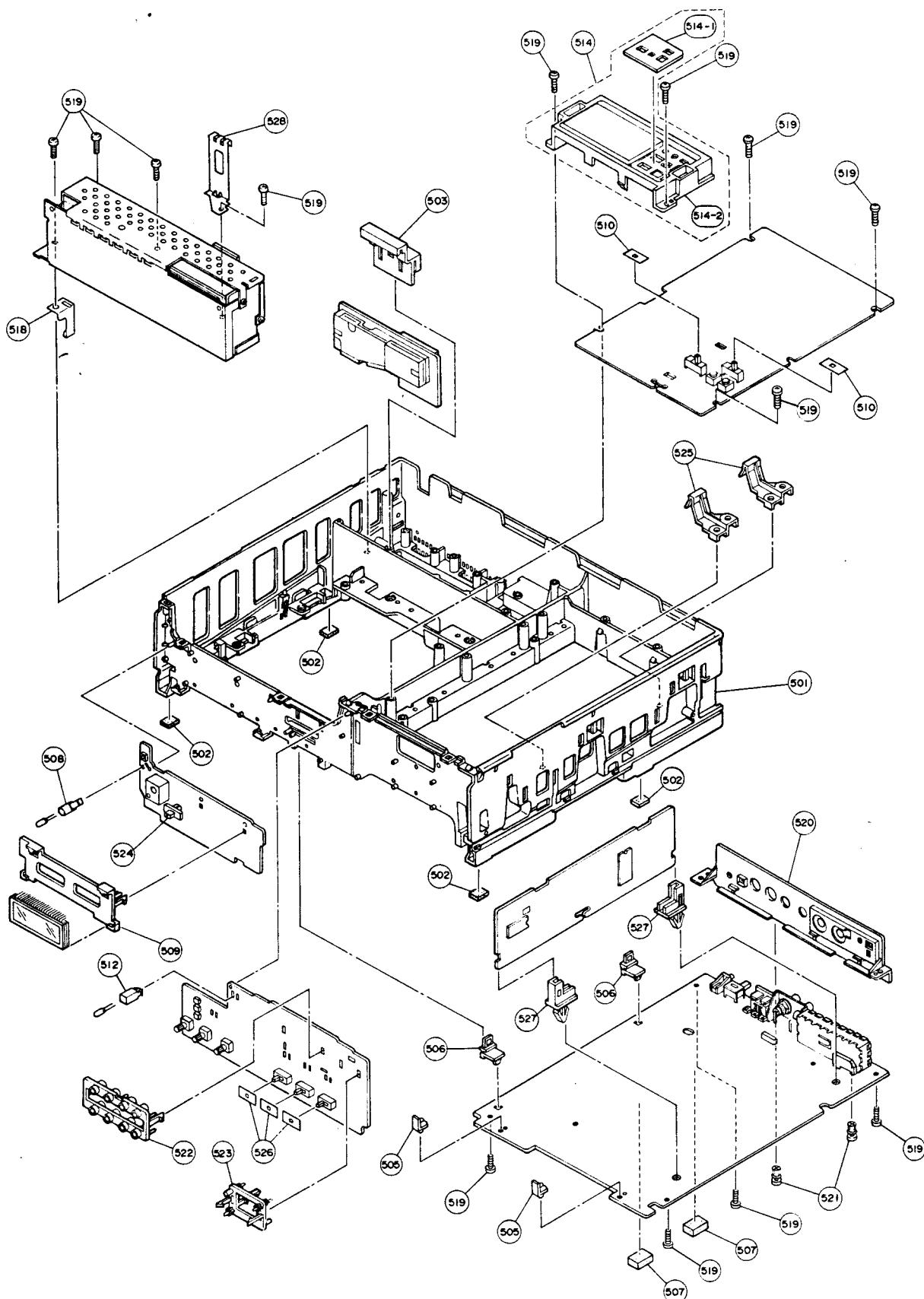
A  
B  
C  
D  
E  
F  
G  
H

Figure 95.

1 2 3 4 5 6

## CABINET PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
201 201-1	CP NLC1385GE01 GCöVA1161GESA	Front panel ass'y Power LED decoration cover	BL AD	201-29 201-30 201-33	GMADI 0099GES A HDECE 0062GES A HP NLC1338GES A	Front indication panel Front decoration plate Sub front panel	AN AN AF
201-2	GDöRF1226GES A	Timer door	AH	201-35	PCöVU9079GES A	Channel LED cover	AC
201-3	HBDGB1057AFSA	Badge "SHARP"	AD	201-36	J BTN- 1795GESB	System button	AD
201-4	Hi NDP0884GES A	Tracking indication panel	AF	201-37	PMLT- 0066GEZZ	System button absorber	AA
201-6-1,	J BTN- 1295GES A	Counter/Timer length select button	AB	201-38	J BTN- 1701GESB	Slow/Frame advance button	AD
201-6-2, 201-6-3, 201-6-4		Counter reset button Counter memory button Simple recording timer button		201-39 201-40	XWHJZ52- 15090 PMLT- 0067GEZZ	Washer Slow/Frame advance button absorber	AB AA
201-8	J BTN- 1475GESB	Channel Up/Down button	AD	201-41	XEBSD30P10000	Screw	AA
201-9	J BTN- 1625GES A	Cassette Eject/Operate button	AD	201-42	L ANGG9053GEFW	Slow/Frame advance button angle	AC
201-10	J BTN- 1709GES A	Record button	AD	201-43	QEARP0144GEFW	Eject/Power button	AB
201-11	J BTN- 1706GES C	Play/Stop button	AH	201-44	QEARP0145GEFW	earth plate	
201-12	J BTN- 1707GES C	Rew/FF search button	AH			Eject/Power button	AB
201-13	J BTN- 1708GES C	Pause/Still button	AH	201-45	J BTN- 1642GESB	earth plate	
201-14	J BTN- 1719GES A	Clock/Timer control buttons	AD	201-46	GCöVA1287GESB	Normal button	AF
201-15	L ANGG9042GEFW	Counter button bracket	AB	201-48	TCAUH3153GEZZ	Sub front panel marker cover	AB
201-16	L ANGG9052GEFW	Channel Up/Down button bracket	AA	201-49	TL ABZ0148GEZZ	Dew caution label	
201-18	PCöVU9074GEZZ	Remote control detector	AC	203	TL ABM1048GEZZ	Feature label	AB
201-19	PCöVU9066GES A	Display window cover	AE	204	GBDYU3020GEZZ	Model label	AB
201-20	PKAi - 1081CE00	Timer door lock holder	AE	205	GCABA3011GES J	Bottom plate	AL
201-21	PMLT- 0065GEZZ	Channel button absorber	AA	207	GFTAT1008GES Y	Top cabinet	AV
201-23	PSPAZ0090GEZZ	Button spacer	AA	208	XEBSD40P16000	Preset tuning control cover	AK
201-27	QEARP0113GEFW	Eject button earth plate	AA	210	XJBSF40P16000	Screw (Bottom plate)	AA
201-28	TL ABH0180GEZZ	Door opening indication label	AA		TL ABS0005GEZZ	Cabinet fixing screw	AA
						High voltage caution label	AB

## CABINET PARTS DIAGRAM

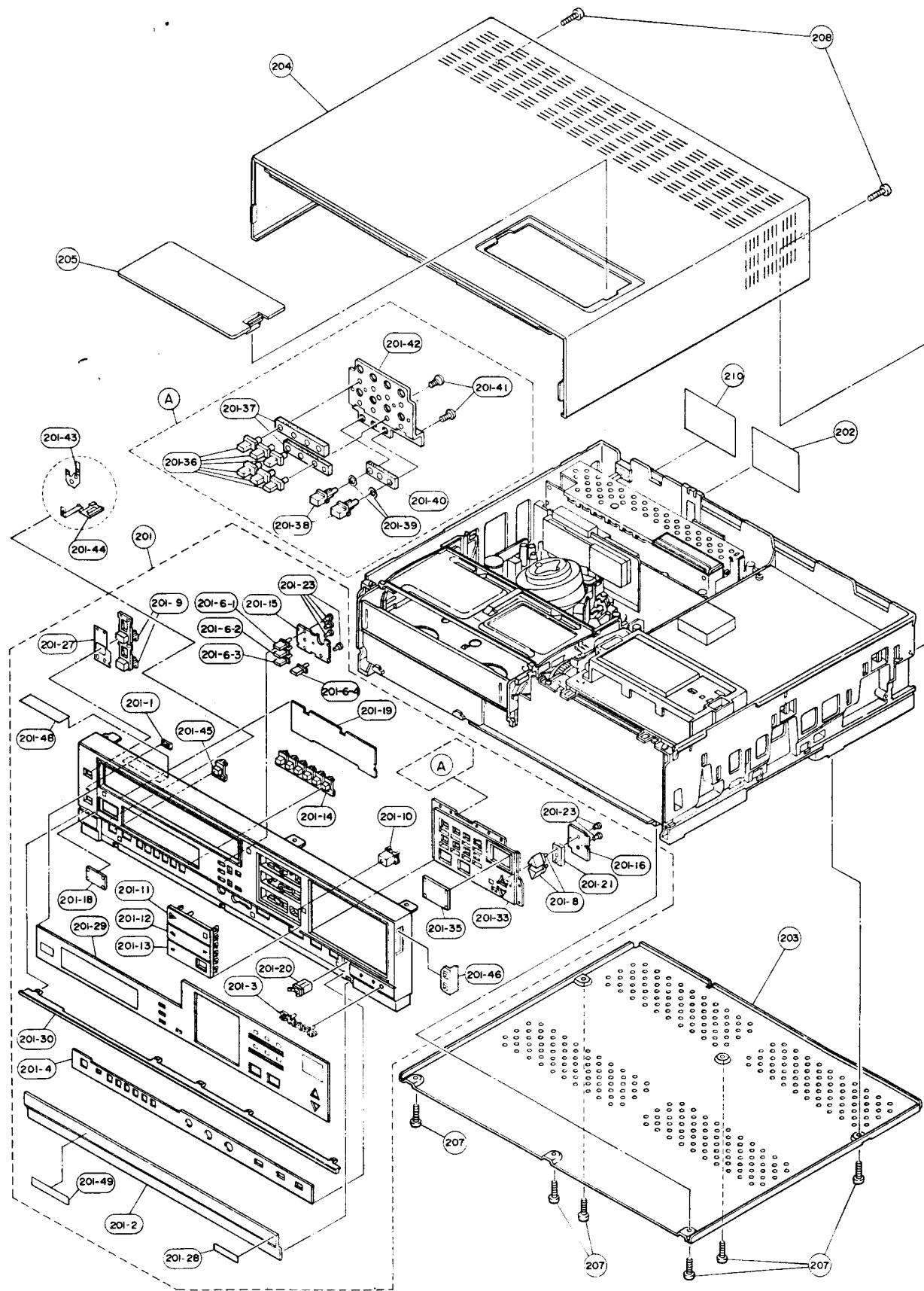
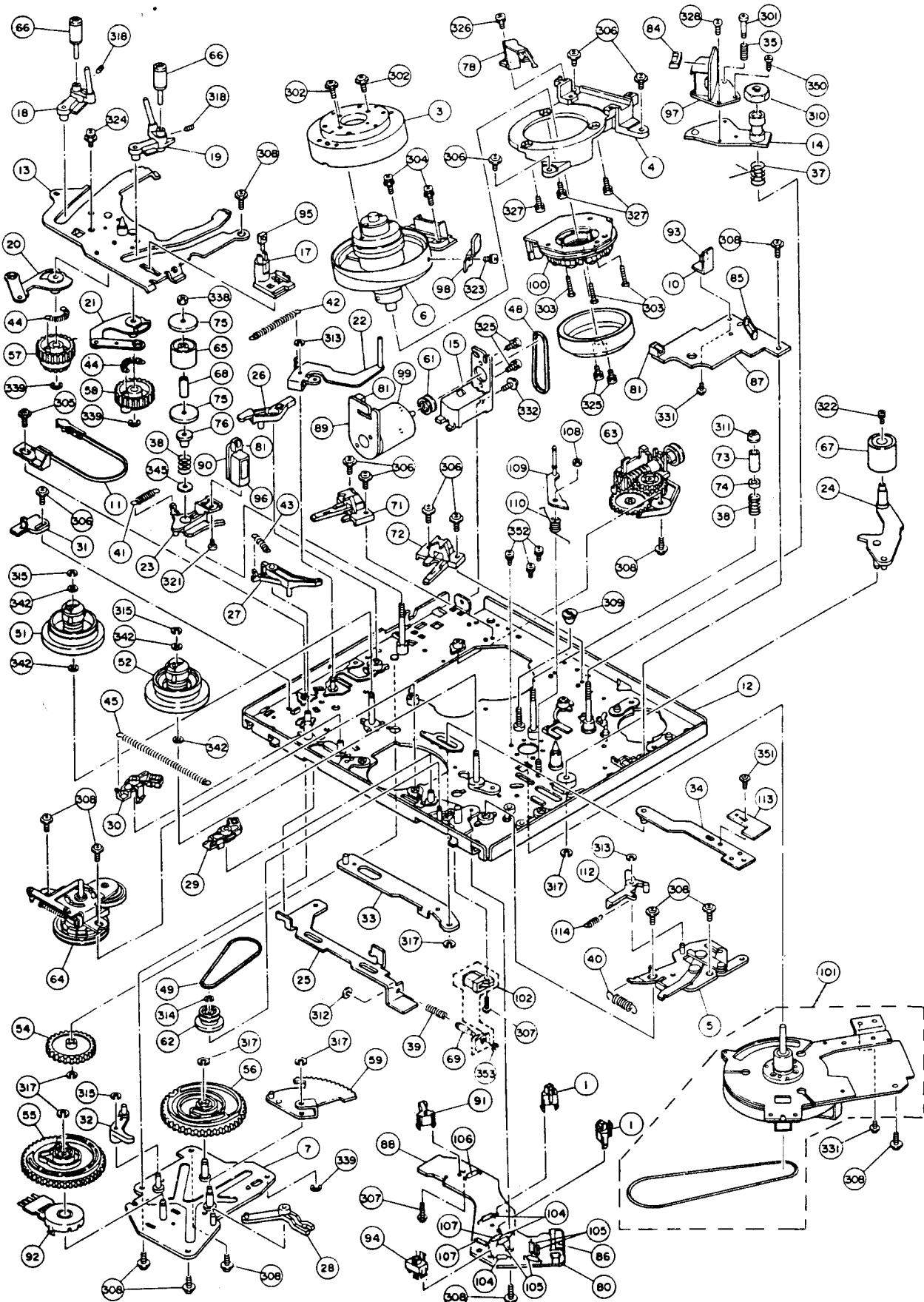


Figure 96.

## MECHANISM CHASSIS PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	RH- PX0090GE01	Photo-interrupter, Counter sensor	AH	66	NRÖLP0047GEZZ	Guide roller ass'y	AH
3	DDR MU0002HE27	Upper drum ass'y	BR	67	NRÖLR0013GEZZ	Pinch roller ass'y	AN
4	PGi DC0026GEFW	V base	AN	68	NSFTL0215GEFW	Supply impedance sub shaft	AB
5	L ANGF9264GEZZ	Pinch roller relay plate ass'y	AK	69	NSFTZ0026GEFD	Brake lock shaft	AA
6	DDRML0006HE03	Lower drum ass'y	BM	71	PGi DC0024GEFW	V block (A) ass'y	AE
7	L ANGF9255GEZZ	Mechanism control angle ass'y	AL	72	PGi DC0025GEFW	V block (B) ass'y	AE
10	L ANGT9089GEFW	Dew sensor angle	AB	73	PGi DP0014GEFW	Retaining guide	AE
11	L BNDK1001GEZZ	Tension band ass'y	AH	74	PGi DP0010GEFW	Retaining guide flange	AC
12	L CHSM0069GEZZ	Main chassis	AX	75	PGi DS0005GEZZ	Supply impedance flange	AE
13	L CHSS0011GEZZ	Guide plate ass'y	AG	76	PGi DS0010GEZZ	Supply impedance flange base	AG
14	L DAI H3013GEZZ	Audio control head plate	AD	78	QBRSK0016GEZZ	Drum ground ass'y	AE
15	L HL DZ1435GEZZ	Loading motor holder	AC	80	QPLGN0229TAZZ	Plug, 2pin (NL) (Reel sensor PWB)	AB
17	L HL DZ1440GEZZ	Cassette LED holder	AF			Plug, 2pin (NF) (Loading motor PWB)	
18	L PÖLM0022GEZZ	Pole base A ass'y	AM	81	QPLGN0280GEZZ	Plug, 2pin (NH) (Full erase head PWB)	AB
19	L PÖLM0023GEZZ	Pole base B ass'y	AM			Plug, 2pin (NE) (Mechanism relay PWB)	
20	MARMM0052GEZZ	Loading arm A ass'y	AE				
21	MARMM0053GEZZ	Loading arm B ass'y	AE				
22	MARMM0054GEZZ	Tension arm ass'y	AE				
23	MARMP0032GEZZ	Full erase head arm	AC				
24	MLEVF0229GEZZ	Pinch roller lever ass'y	AH	84	QPLGN0878GEZZ	Plug, 8pin (NT)	AC
25	MLEVF0225GEZZ	Brake drive lever ass'y	AF	85	QPLGN0378GEZZ	Plug, 3pin (NB)	AB
26	MLEVP0082GEZZ	Release lever	AA	86	QPLGN1080GEZZ	Plug, 10pin (NA)	AC
27	MLEVP0083GEZZ	Auxiliary brake lever	AA	87	QPWBF1870GEZZ	Mechanism relay PWB	—
28	MLEVP0084GEZZ	Torque change lever	AA	88	QPWBF1973GEZZ	Reel sensor PWB	—
29	MLEVP0085GEZZ	Take-up brake lever	AC	89	QPWBF1568GEZZ	Loading motor PWB	—
30	MLEVP0086GEZZ	Supply brake lever	AC	90	QPWBF1569GEZZ	Full head PWB	—
31	MLEVP0087GEZZ	Tension adjusting lever	AC	91	QSW-F0024GEZZ	Shifter switch (Reel sensor PWB)	AD
32	MLEVP0088GEZZ	Tension release lever	AC				
33	MSLI F0023GEZZ	Shifter ass'y (A)	AE	92	QSW-R0017GEZZ	Cam switch	AK
34	MSLI F0024GEZZ	Shifter ass'y (B)	AD	93	RDTCH0018GEZZ	Dew sensor	AG
35	MSPRC0006GEFJ	Audio control head spring	AA	94	RH- PX0090GE02	Photo-interrupter	AG
37	MSPRC0084GEFJ	Audio control head arm spring	AA	95	RH- PX0099GEZZ	Cassette LED	AG
38	MSPRC0085GEFJ	Supply impedance roller/Retaining guide adjusting spring	AA	96	RHEDT0019GEZZ	Full erase head ass'y	AP
				97	RHEDU0053GEZZ	Audio control head ass'y	AW
				98	RHETP0013GEZZ	Heater ass'y	AG
				99	RMÖTM1029GEZZ	Loading motor	AP
39	MSPRC0086GEFJ	Brake lock spring	AA	100	RMÖTP1080GEZZ	Direct drive motor ass'y	BB
40	MSPRTO216GEFJ	Pinch pressure spring	AB	101	RMÖTP1079GEZZ	Capstan DD motor	BF
41	MSPRTO217GEFJ	Full erase head arm spring	AA	102	RPLU-0075GEZZ	Brake solenoid	AG
42	MSPRTO218GEFJ	Tension arm spring	AA	104	VCKYAT1HD102M	0.001 $\mu$ F, 20%, 50V (C8001, 8003, 8004) (Reel sensor PWB)	AA
43	MSPRTO219GEFJ	Auxiliary brake spring	AA				
44	MSPRTO220GEFJ	Loading gear reciprocating spring	AA	105	VRD- RA2EE473J	47K ohm, 5%, 1/4W, carbon (R8002, 8006, 8008) (Reel sensor PWB)	AA
45	MSPRTO221GEFJ	Main brake spring	AA				
48	NBLTK0039GE00	Loading belt	AB				
49	NBLTK0033GE00	Reel sensor belt	AB	106	VRD- RA2EE222J	2.2K ohm, 5%, 1/4W, carbon (R8009) (Reel sensor PWB)	AA
51	NDAIV1032GEZZ	Supply reel disk ass'y	AF				
52	NDAIV1033GEZZ	Take-up reel disk ass'y	AF				
54	NGERH1072GEZZ	Relay gear (B)	AB	107	VRD- RA2EE221J	220 ohm, 5%, 1/4W, carbon (R8001, 8005, 8007) (Reel sensor PWB)	AA
55	NGERH1073GEZZ	Brake cam	AC				
56	NGERH1074GEZZ	Master cam	AC				
57	NGERH1075GEZZ	Loading gear (A) ass'y	AD	108	LX- NZ3019GEZZ	Adjusting nut	AB
58	NGERH1076GEZZ	Loading gear (B) ass'y	AC	109	MLEVF0227GEZZ	Reverse guide lever	AC
59	NGERH3024GEZZ	Segment gear ass'y	AE	110	MSPRC0088GEFJ	Reverse guide spring	AA
61	NPLYV0036GEZZ	Loading motor pulley	AB	112	MLEVP0089GEZZ	Video search brake lever	AA
62	NPLYV0101GEZZ	Reel sensor pulley	AC	113	MLEVF0228GEFW	Video search brake adjusting plate	AB
63	NPLYV0102GEZZ	Loading block ass'y	AL				
64	NPLYV0107GEZZ	Reel drive unit	AQ	114	MSPRT0226GEFJ	Video search brake spring	AA
65	NRÖLP0046GEZZ	Supply impedance roller	AH				

# MECHANISM CHASSIS PARTS DIAGRAM



**Figure 97.**

## CASSETTE HOUSING CONTROL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	HDECQ0205GE SA	Cassette cover	AL	19	NGERW1013GE ZZ	Worm	AC
2	L ANGF9251GE FW	Top plate	AG	20	NGERW1014GE ZZ	Worm wheel	AC
3	L ANGF9252GE ZZ	Motor angle ass'y	AC	21	NPLYV0100GE ZZ	Motor pulley	AA
4	L HL DX1005GE 00	Frame (right)	AK	22	NSFTL0442GE FD	Main shaft	AD
5	L HL DX1006GE 00	Frame (left)	AH	23	PGIDM0042GE 00	Down guide	AF
6	L HL DX3029GE ZZ	Slider ass'y	AL	24	PGUMM0028GE ZZ	Worm anti-vibration rubber	AB
6-1	L HL DX1003GE 00	Holder (right)	AG	26	QPLGN0980GE ZZ	Plug (9 pin)	AC
6-2	L HL DX1004GE 00	Holder (left)	AG	27	QPWBF1755GE ZZ	Relay P.W.B.	—
6-3	L HL DX3029GE FW	Slider	AE	28	QPWBF1553GE ZZ	End sensor P.W.B.	—
6-4	MARMP0028GE ZZ	Lock release ass'y	AD	29	QSW-F0021GE ZZ	Cassette switch	AD
6-5	MSPRP0097GE FJ	Cassette spring	AA	30	QSW-F0022GE ZZ	Mode switch	AE
7	MARMM0051GE FW	Drive washer	AB	31	QSW-F0023GE ZZ	Mistaken erasure prevention switch	AD
8	MARMP0029GE ZZ	Drive arm (right)	AB	33	RH-PX0053GE ZZ	Photo-transistor	AF
9	MARMP0030GE ZZ	Drive arm (left)	AB	34	RMOTM1033GE ZZ	Cassette motor	AP
10	MARMP0031GE ZZ	Cassette cover arm	AA	35	MSPRD0067GE FJ	Cassette cover spring	AA
11	MLEVP0080GE ZZ	Timing lever	AA	36	VRD-RA2EE153J	Resistor (15K ohm)	AA
12	MLEVP0081GE ZZ	Cover open lever	AB	37	VS2SA937-Q/-1	Transistor	AC
13	MSPRD0065GE FJ	Drive reciprocating spring	AA	38	VRD-RA2BE222J	Resistor (2.2K ohm)	AA
14	MSPRD0066GE FJ	Open lever spring	AA	39	VRD-RA2EE223J	Resistor (22K ohm)	AA
15	MSPRT0215GE FJ	Drive spring	AA	41	VCTYPA1EX473M	Capacitor (0.047μF)	AA
16	NGERH1069GE ZZ	Drive gear (right)	AC		CHLDX3030GE 09	Cassette housing ass'y	BD
17	NGERH1070GE ZZ	Drive gear (left)	AB				
18	NGERH1071GE ZZ	Phase gear	AA				

## CASSETTE HOUSING CONTROL PARTS DIAGRAM

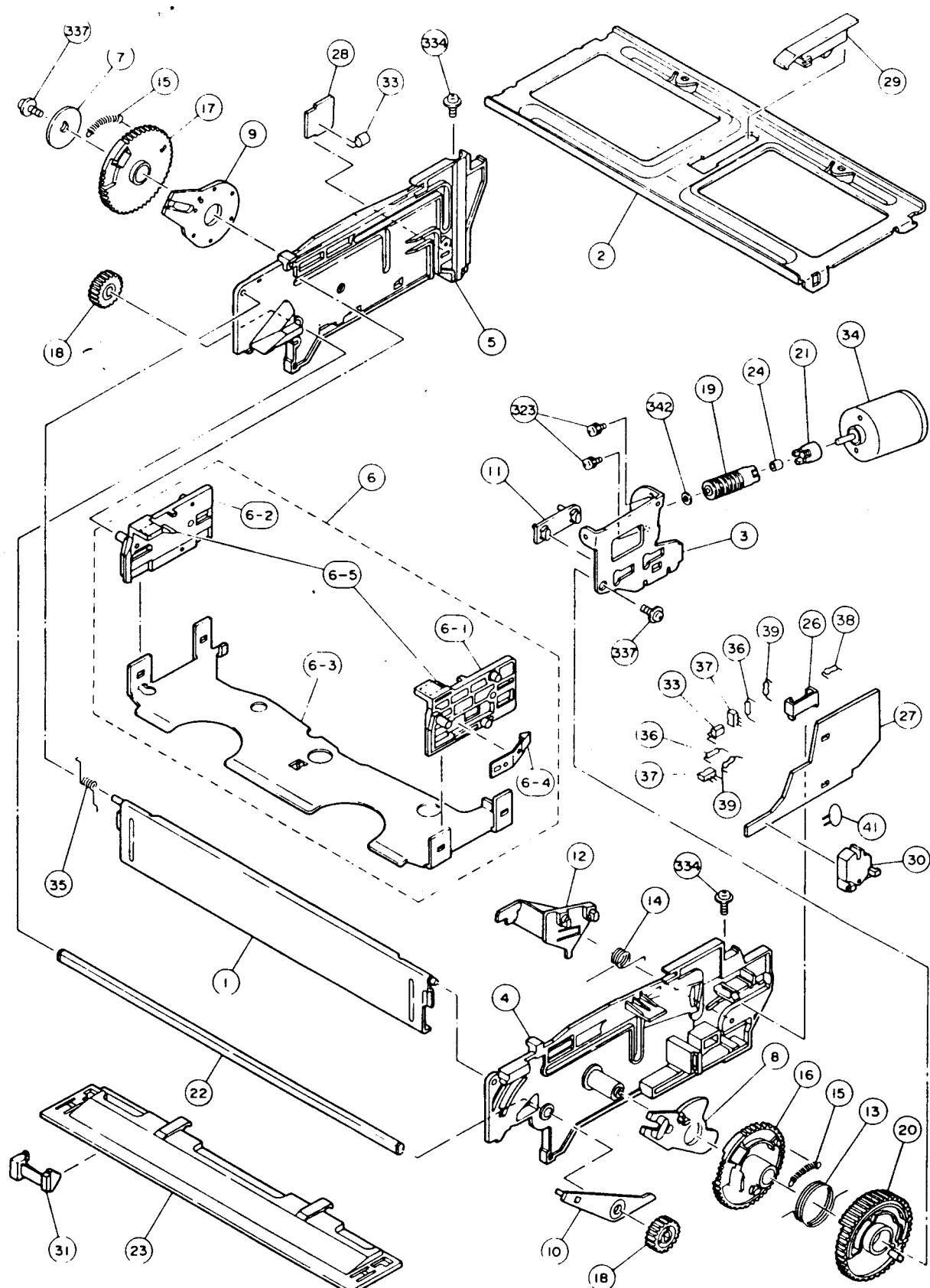


Figure 98.

## SCREW, NUTS, WASHERS, AND WIRE CLAMP

REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE	REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE
301	LX-BZ3018GEZZ	AC head screw		AA	324	XBPSD30P05JS0	Screw	WSW3P+5S	AA
302	LX-BZ3039GEFN	Screw	W3P+9S-Ni	AA	325	XBPSD30P05J00	Screw	SW3P+5S	AA
303	LX-BZ3047GEFD	Screw	2.6P+12S-Ni	AA	326	XBPSD30P06J00	Screw	SW3P+6S	AA
304	LX-BZ3049GEFD	Screw	WSW3P+10S	AA	327	XBPSD30P08J00	Screw	SW3P+8S	AA
305	LX-HZ3002GEFD	Screw	3x8	AA	328	XBPSD30P08000	Screw	3P+8S	AA
306	LX-HZ3008GEFD	Screw	S3P+8S-W	AA	331	XHPSD30P06WS0	Screw	C3P+6S	AA
307	LX-HZ3026GEFD	Screw	2x8	AA	332	XHPSD30P08WS0	Screw	C3P+8S	AA
308	LX-HZ3027GEFD	Screw	3x8	AA	334	XHPS330P06WS0	Screw	C3P+6S (Red)	AA
309	LX-NZ3013GEFW	Nut		AA	337	XJPSD30P06WS0	Screw	C3P+6S	AA
310	LX-NZ3031GEFW	Nut		AA	338	XNESD30-02000	Nut		AA
311	LX-NZ3016GEFD	Nut		AB	339	XRESJ30-06000	Screw	E ring-3	AA
312	LX-WZ1001GE00	Washer	3.2W-8-0.5	AA	342	XWHJZ31-05054	Washer	3.1W-5.4-0.5	AA
313	LX-WZ1003GE00	Washer	2.1W-5-0.5	AA		LX-WZ1017GE00	Washer	3.1W-5.4-0.2	AA
314	LX-WZ1005GE00	Washer	1.6W-4-0.5	AA		LX-WZ1018GE00	Washer	3.1W-5.4-0.3	AA
315	LX-WZ1006GE00	Washer	2.6W-5.4-0.5	AA	345	XWHSD32-05100	Washer	3.1W-5.4-0.4	AA
317	LX-WZ1015GE00	Washer	3.6W-7.2-0.5	AA	350	LX-BZ3065GEFD	Screw	3.2W-10-0.5	AA
318	LX-XZ3001GEFP	Fixing screw	M2x3	AC	351	LX-HZ3031GEFD	Screw	S2.6P+5S-	AA
321	XBPSD20P03000	Screw	2P+3S	AA	352	XBPSD26P06JS0	Screw	7W0.5	AA
322	XBPSD26P04J00	Screw	SW2.6P+4S	AA	353	XRESJ12P03000	Screw	WSW2.6P+6S	AA
323	XBPSD30P04J00	Screw	SW3P+4S	AA			E-ring	E1.2-T0.3	AA

## PACKING OF THE SET

### ■ Setting positions of the knobs

Auto function	at "OFF" Position	Tracking knob	at "center click" Position
Test signal switch	at "OFF" Position	Timer	at "OFF" Position
AFT switch (VHF/UHF)	at "Normal" Position	Colour system switch	at "Auto" Position
Rec. selector switch	at "Tuner" Position	Still tracking	at "center" Position
Picture tone	at "center" Position	SP/LP(EP) selector switch	at "SP" Position
RF system switch	at "B/G" Position		

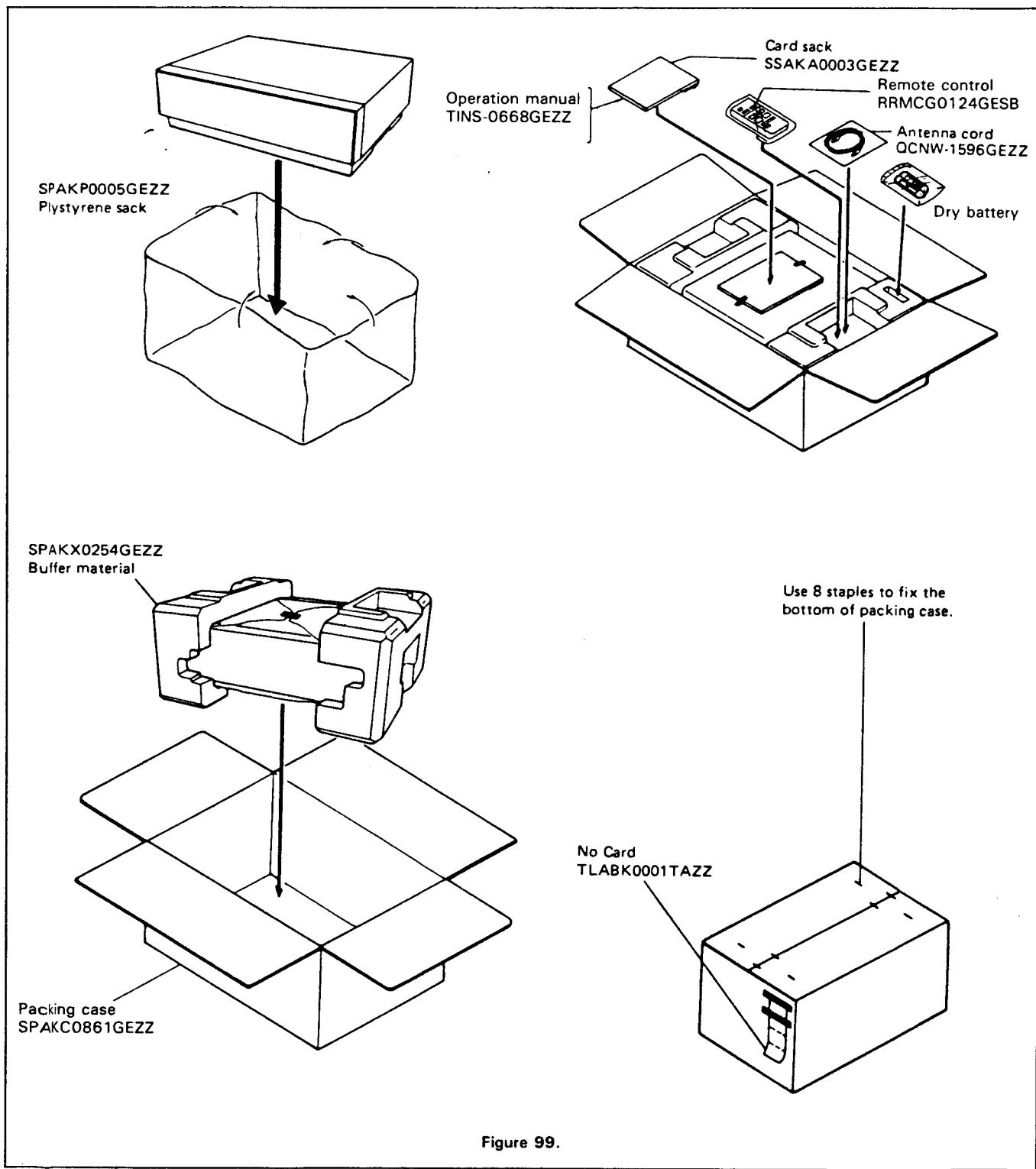


Figure 99.

**SHARP**